Iowa Department of Transportation

Bid Response

	Date Bids Due	Time of Bid Opening	Bid Opening Location
	12/1/2010	1:00 PM	Iowa DOT Purchasing Office Ames, IA

Proposal Number	Description
4618	11 A07: Medium Duty Single Axle Snow Removal Trucks

Contract to Begin	Date of Completion	Proposal Guaranty Amount	Liquidated Damages
12/22/2010	12/22/2011	$20,000.00	$25.00

Additional Information Contact	E-Mail Address	Phone	Fax
Jerry Giebelstein	jerry.giebelstein@dot.iowa.gov	515-239-1347	515-239-1538

Company Name	Federal Tax ID

Street Address	City	State	Zip Code

Individual preparing bid (type or print)	E-Mail Address	Phone	Fax

Will you sell these items/services to political subdivisions within the State of Iowa under the same prices, terms and conditions as specified?	Are you a Iowa Targeted Small Business?
☐ YES ☐ NO	☐ YES ☐ NO

GENERAL INFORMATION

This bid package includes the proposal, schedule of prices, standard terms and conditions, supplemental terms, specifications, mailing label and other information you need to prepare your bid. The pages of the document labeled “Bid response” must be typed or completed in ink, signed, and returned in a flat style envelope prior to the bid opening date and time. Please use the furnished mailing label, or indicate on your return bid by marking “Iowa Department of Transportation, proposal number & letting date” on the outside of the return envelope. The bidder may personally deliver, mail, or select a carrier that ensures timely delivery. **Faxed bids will not be accepted.**

If required, each bid must be accompanied by a proposal guaranty in an accepted form, in the sum indicated above. Refer to the Standard Terms and Conditions for the accepted forms in which the proposal guaranty requirement may be fulfilled. Bids lacking a required proposal guaranty will not be considered for award. If the contractor fails to enter into a formal contract within fifteen (15) days after award is made, the proposal guaranty may be retained by the State.

PROPOSAL STATEMENT

The entire contents of this Proposal, Addendums to the Proposal, Specifications, Supplemental Terms and Conditions, Standard Terms and Conditions, and Schedule of Prices shall become part of the contract.

We promise to enter into a contract within fifteen (15) days after award or forfeit the proposal guaranty furnished herewith.

We promise to furnish all materials, equipment and/or services specified, in the manner and the time prescribed, at prices hereinafter set out.

We certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a bid; that this bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; and that this bid has not been knowingly disclosed prior to the opening of bids to any other bidder or competitor.

We certify that all materials, equipment and/or services proposed meet or exceed the specifications and will be supplied in accordance with the entire contents of this proposal.

We promise to complete the contract within the contract period, or pay any liquidated damages, if stipulated, for each calendar day as set forth in the bid documents.

Signed: _____ **Date:** _____

Iowa Department of Transportation

Schedule Of Prices

Number **4618**

Date Required 12/1/2010

11 A07: Medium Duty Single Axle Snow Removal Trucks

Delivery Location DELBERT JONES
AMES MACHINE SHOP
800 LINCOLNWAY
AMES, IA 50010

Shipping Terms FOB Destination/Freight Prepaid

Item	Description	Qty	Unit	Price
A	Group A Turnkey Single Axle Snow Removal Trucks			
A.1	Turnkey Single Axle Snow Removal Trucks Complete Turnkey Price to include: Truck Cab Chassis: Make_____ Model_____ BBC_____ WB_____ Vendor Prep.: Equipment Installer:_____ Hydraulic System: Make_____ Model_____ 4 Cu Yd Body with Hyd. Hoist: Make_____ Model_____ Stainless Steel Tailgate Spreader Left Discharge: Make_____ Model_____ 140 Gallon Tailgate Mounted Pre-Wetter: Make_____ Model_____ as per Spec No. 24-A07-1110	24	EACH	
AO.1	Option No.1: Front Axle 16,000 Lb. (16K) List Make_____ Model_____	6	EACH	
AO.2	Option No.2: Extended Cab (EC) List Make_____ Model_____ Adjusted BBC_____ Adjusted WB_____	3	EACH	
AO.3	Option No.3: Crew Cab (CC) List Make_____ Model_____ Adjusted BBC_____ Adjusted WB_____	3	EACH	
AO.4	Option No.4: Long Wheelbase (LWB) List Make_____ Model_____ Adjusted BBC_____ Adjusted WB_____	8	EACH	
AO.5	Option No.5: Spreader Dual (DS) List Make_____ Model_____	7	EACH	

Iowa Department of Transportation

Schedule Of Prices

Number **4618**

11 A07: Medium Duty Single Axle Snow Removal Trucks

Item	Description	Qty	Unit	Price
AO.6	Option No.6: Spreader Center (CS) List Make_____ Model_____	1	EACH	
AO.7	Option No.7: Spreader Right (RS) List Make_____ Model_____	1	EACH	
AO.8	Option No.8: Zero-Velocity Spreader Left (ZVL) List Make_____ Model_____	7	EACH	
AO.9	Option No.9: Zero-Velocity Spreader Right (ZVR) List Make_____ Model_____	1	EACH	
AO. 10	Option No.10: Left Winter Combination Tailgate (WTG-L) List Make_____ Model_____	1	EACH	
AO. 11	Option No.11: Dual Winter Combination Tailgate (WTG-D) List Make_____ Model_____	1	EACH	
AO. 12	Option No.12: Zero-Velocity Left Winter Combination Tailgate (WTG-ZL) List Make_____ Model_____	7	EACH	
AO. 13	Option No.13: Zero-Velocity Right Winter Combination Tailgate (WTG-ZVR) List Make_____ Model_____	1	EACH	
AO. 14	Option No.14: In-Bed Wedge Tank Anti-Ice System (IA-S) List Make_____ Model_____	6	EACH	
AO. 15	Option No.15: Radius Dump Body With 150 Gallon Prewet (RDS/150PW) List Make_____ Model_____	1	EACH	
AO. 16	Option No.16: Wing Hydraulic (WH) List Make_____ Model_____	16	EACH	
AO. 17	Option No.17: Light Duty Mid-Extendable Wing L or R (LDW) List Make_____ Model_____	7	EACH	
AO. 18	Option No.18: Light Duty Mid-Mount Wing Left or Right (LDMW) List Make_____ Model_____	4	EACH	

Iowa Department of Transportation

Schedule Of Prices

Number **4618**

11 A07: Medium Duty Single Axle Snow Removal Trucks

Item	Description	Qty	Unit	Price
AO. 19	Option No.19: Light Duty Mid-Mount Wing Dual (LDMW-D) List Make_____ Model_____	1	EACH	
AO. 20	Option No.20: Medium Duty Front Wing (MDFW) List Make_____ Model_____	3	EACH	
AO. 21	Option No.21: Medium Duty Rear-Rear Wing (MDRRW) List Make_____ Model_____	2	EACH	
AO. 22	Option No.22: Underbody Snow Plow (UBP) List Make_____ Model_____	17	EACH	
AO. 23	Option No.23: Schmidt/Wausau SQH Front Plow Hitch System (SQH) List Make_____ Model_____	1	EACH	
AO. 24	Option No.24: Automatic Tire Chains (TC) List Make_____ Model_____	2	EACH	
AO. 25	Option No.25: Automatic Tarp (AT) List Make_____ Model_____	4	EACH	
AO. 26	Option No.26: Casting Hydraulic Circurits (CH) List Make_____ Model_____	1	EACH	
B	Group B Cab Chassis Single Axle for Snow Removal Truck			
B.1	Single Axle Cab Chassis List Chassis Make_____ Model_____ WB_____	24	EACH	
BO.1	Option No.1: Front Axle 16,000 Lb. (16K) List Make_____ Model_____	6	EACH	
BO.2	Option No.2: Extended Cab (EC) List Make_____ Model_____ Adjusted BBC_____ Adjusted WB_____	3	EACH	
BO.3	Option No.3: Crew Cab (CC) List Make_____ Model_____ Adjusted BBC_____ Adjusted WB_____	3	EACH	

11 A07: Medium Duty Single Axle Snow Removal Trucks

Item	Description	Qty	Unit	Price
BO.4	Option No.4: Long Wheelbase (LWB) List Make_____ Model_____ Adjusted BBC_____ Adjusted WB_____	8	EACH	
C	Group - Equipment Installation Pricing for Single Axle Trucks			
C1	Base - Vendor Preparation and Hydraulic System for Single Axle Snow Removal Truck as per Spec. No. 24-A07-1110 List Equipment Installer_____ Hydraulic System_____ Component Models_____	24	EACH	
C2	Base - Domp Body 4 Cu. Yd. List Make_____ Model_____	24	EACH	
C3	Base - Stainless Steel Tailgater Spreade List Make_____ Model_____	24	EACH	
C4	Base - 140 Gallon Tailgete Mounted Pre-W List Make_____ Model_____	24	EACH	
CO.5	Option No.5: Dual Spreader (DS) List Make_____ Model_____	7	EACH	
CO.6	Option No.6: Center Spreader (CS) List Make_____ Model_____	1	EACH	
CO.7	Option No.7: Right Spreader (RS) List Make_____ Model_____	1	EACH	
CO.8	Option No.8: Zero-Velocity Spreader System Left (ZVL) List Make_____ Model_____	7	EACH	
CO.9	Option No.9: Zero-Velocity Spreader System Right (ZVR) List Make_____ Model_____	1	EACH	
CO.10	Option No.10: Winter Combination Tailgate Left (WTG-L) List Make_____ Model_____	1	EACH	

Iowa Department of Transportation

Schedule Of Prices

Number **4618**

11 A07: Medium Duty Single Axle Snow Removal Trucks

Item	Description	Qty	Unit	Price
CO. 11	Option No.11: Winter Combination Tailgate Dual (WTG-D) List Make_____ Model_____	1	EACH	
CO. 12	Option No.12: Zero-Velocity Winter Combination Tailgate Left (WTG-ZVL) List Make_____ Model_____	7	EACH	
CO. 13	Option No.13: Zero-Velocity Winter Combination Tailgate Right (WTG-ZVR) List Make_____ Model_____	1	EACH	
CO. 14	Option No.14: In-Bed Wedge Tank Anti-Ice System (AI-S) List Make_____ Model_____	6	EACH	
CO. 15	Option No.15: Radius Dump Body With 150 Gallon Prewet (PDS/150PW) List Make_____ Model_____	1	EACH	
CO. 16	Option No.16: Wing Hydraulic (WH) List Make_____ Model_____	16	EACH	
CO. 17	Option No.17: Light Duty Mid-Extendable Wing L or R (LDW) List Make_____ Model_____	7	EACH	
CO. 18	Option No.18: Light Duty Mid-Mount Wing l or R (LDMW) List Make_____ Model_____	4	EACH	
CO. 19	Option No.19: Light Duty Mid-Mount Wing Dual (LDMW-D) List Make_____ Model_____	1	EACH	
CO. 20	Option No.20: Medium Duty Front Wing (MDFW) List Make_____ Model_____	3	EACH	
CO. 21	Option No.21: Medium Duty Rear-Rear Wing (MDRRW) List Make_____ Model_____	2	EACH	
CO. 22	Option No.22: Underbody Snow Plow (UBP) List Make_____ Model_____	17	EACH	
CO. 23	Option No.23: Schmidt/Wausau SQH Front Plow Hitch System (SQH) List Make_____ Model_____	1	EACH	

Iowa Department of Transportation

Schedule Of Prices

Number **4618**

11 A07: Medium Duty Single Axle Snow Removal Trucks

Item	Description	Qty	Unit	Price
CO. 24	Option No.24: Automatic Tire Chains (TC) List Make_____ Model_____	2	EACH	
CO. 25	Option No.25: Automatic Tarp (AT) List Make_____ Model_____	4	EACH	
CO. 26	Option No.26: Casting Hydraulic Circurit (CH) List Make_____ Model_____	1	EACH	

I HEREBY CERTIFY THAT THIS PROPOSAL MEETS OR EXCEEDS THE MINIMUM REQUIREMENT INCLUDING SPECIFICATIONS AND ADDENDUMS.

(Please Print)

Company Name: _____ Phone: _____ Fax: _____

Address: _____ City: _____ State: _____ Zip: _____

Contact Person: _____ Email: _____

Signature: _____ Fed Tax ID: _____

Availability After Receipt of P.O. (in Days): _____

I Acknowledge Receipt of Addendum Numbers: _____

Bidder _____

_____

_____

_____

SEALED BID

LETTING DATE: December 1, 2010
PROPOSAL NO: 4618
PROPOSAL DESCRIPTION: 11 A07: Medium Duty Single Axle Snow Removal Trucks

Iowa Department of Transportation
PURCHASING - SEALED BID PROPOSAL
800 Lincoln Way
Ames, IA 50010

Iowa Department of Transportation
PURCHASING PROPOSAL
Standard Terms and Conditions

Contents of Contract: The entire contents of this proposal shall become a part of the contract or purchase order. In case of a discrepancy between the contents of the contract documents, the following items listed by descending order shall prevail:

- Addendums
- Purchasing Proposal/Schedule of Prices
- Specifications, Plans and Drawings
- Supplemental Terms and Conditions
- Standard Terms and Conditions

For example, if there is a statement in the specifications that contradicts a statement in the Standard Terms and Conditions, the statement in the specifications shall apply.

Preparation of Proposal: All proposals must be completed in every respect and must clearly answer all questions contained in the proposal. Bids must be typed or completed in ink on the forms supplied by the department. **You must sign your bid and seal it in the envelope.** Bids must be received prior to the bid opening date and time. The bidder may personally deliver, mail, or select a carrier that ensures timely delivery

Proposal Guaranty: If required, a proposal guaranty, in the sum listed on the proposal form, can be supplied in one of the following ways: (1) A certified check or credit union certified share draft, cashier's check, or bank draft, drawn on a solvent bank or credit union, may be certified furnished with your bid. Certified checks and certified share drafts shall be drawn and endorsed in the amount indicated. Checks or drafts shall be made payable either to the Iowa Department of Transportation (Iowa DOT) or to the bidder. If payable to the bidder, the check or draft shall be endorsed, without qualifications, to the Iowa DOT by the bidder or his authorized agent. (2) An insurance or surety company may be retained to provide a bond in fulfillment of the proposal guaranty requirement. A properly completed and signed copy of the Proposal Guaranty (Form 131071) must accompany the bid. The Iowa DOT's Proposal Guaranty form must be used, no other forms or formats will be accepted.

Bid Opening: Bid Openings are public and conducted at the Ames complex unless otherwise specified. Proposals received after the time of the bid opening will be returned unopened.

Debarment and Vendor Suspension: By submitting a proposal, the contractor is certifying that it and its Principals and/or subcontractors are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by the State of Iowa or any Federal department or agency.

Communications: Questions concerning this proposal should be directed to the Purchasing Agent listed on the Purchasing Proposal. Inquiries can be written, phoned, or faxed. In all cases, written communication will take precedence over verbal communication.

Faxed bids will not be accepted.

Acceptance/Rejection: The State of Iowa reserves the right to accept or reject any or all bids and to waive irregularities or technicalities, provided such waiver does not substantially change the offer or provide a competitive advantage to any vendor, in the judgement of the Iowa DOT. The Iowa DOT also reserves the right to accept that bid which is deemed to be in the best interests of the state. Any unauthorized changes, additions, or conditional bids including any ties to another bid or proposal or any reservations about accepting an award or entering into a contract, may result in rejection of the bid. Bids must remain available for award for thirty (30) days from date of bid opening.

Method of Award: Award shall be made to the lowest responsible, responsive bidder unless otherwise specified. By virtue of statutory authority preference will be given to products and provisions grown and coal produced within the State of Iowa.

Award Protests: Protests of award recommendations are to be addressed to the Director of Purchasing, and shall be made in accordance with paragraph 761--20.4(6)"e", Iowa Administrative Code.

Bid Results & Disclosure: A bid tabulation will be sent to all responsive bidders with an award recommendation indicated. At the conclusion of the selection process, the contents of all proposals will be placed in the public domain and be open to inspection by interested parties, according to state law. Trade secrets or proprietary information that are recognized as such and are protected by law may be withheld if clearly identified as such in the proposal.

Contracts: Successful contractor(s) may be sent either a formal Contract or a Notification of Award as confirmation of acceptance and award. Contracts shall be for the term stated on the Proposal and may be extended for additional period(s) under the same terms and conditions upon mutual agreement. The contractor may not assign the contract to another party without written authorization from the Office of Procurement and Distribution.

Pricing and Discount: Unit prices shown on the bid/proposal shall be quoted as the price per unit (e.g., gal., case, each, etc.) as stated on the request. If there is a discrepancy between the unit bid prices, extension, or total amount of bid, the unit prices shall prevail. Unless otherwise indicated, prices shall be firm for the duration of the contract or purchase. Discounts for early payment are allowed, but not considered in award of the contract.

Taxes: Prices quoted shall not include state or federal taxes from which the state is exempt. Exemption certificates will be furnished upon request.

Payment Terms: The Iowa DOT will normally pay properly submitted vendor invoices within fifteen (15) days of receipt, providing goods and/or services have been delivered, installed or inspected (if required), and accepted. Invoices presented for payment must be only for quantities received by the Iowa DOT, must reference the purchase order number, and be submitted for processing.

Quality: All material shall be new and of first quality. Items which are used, demonstrators, refurbished, obsolete, seconds, or which have been discontinued are unacceptable without prior written approval by the Iowa DOT.

Recycled Content: The Iowa Code encourages purchase of products and materials with recycled content, including but not limited to paper products, oils, plastic products, compost materials, aggregate, solvents, and rubber products. When bidding recycled items or alternatives, note on your bid the recycled content, if known.

Infringement: Goods shall be delivered free of the rightful claim of any third party by way of infringement. Contractor shall indemnify and save harmless the State of Iowa and the Iowa DOT against all claims for infringement of, and/or royalties claimed under, patents or copyrights on materials and equipment furnished under this bid.

Default: Failure of the contractor to adhere to specified delivery schedules or to promptly replace rejected materials shall render the contractor liable for all costs in excess of the contract price when alternate procurement is necessary. This shall not be the exclusive remedy and the Iowa DOT reserves the right to pursue other remedies available to it by law or under the terms of this contract.

Ames Deliveries: Materials delivered to the Distribution Center's Receiving Section, 800 Lincoln Way, Ames, IA shall be delivered between the hours of 7:30 a.m. and 3:30 p.m. on any day except Saturday, Sunday, or a holiday. For deliveries to locations other than the Distribution Center, the contractor may wish to contact the destination location for available times to deliver, as some Iowa DOT offices and locations work a non-standard work week.

Delivery: Deliveries shall be F.O.B. destination unless otherwise specified. All deliveries shall be accompanied by a packing slip indicated the vendor, quantities shipped, and the purchase order number(s). All delivery charges shall be included in the bid price and paid by the contractor. No collect or C.O.D. deliveries will be accepted. When entering into a contract, the contractor shall notify the freight company that all freight and delivery charges are to be prepaid by the contractor. The Iowa DOT will not be liable for any freight claims or unpaid freight bills arising from this contract.

Applicable Law: The contract shall be governed under the laws of the State of Iowa. The contractor shall at all times comply with and observe all federal and state laws, local laws, ordinances, and regulations which are in effect during the period of this contract and which in any manner affect the work or its conduct. Any legal action relating to the contract shall only be commenced in the Story County, Iowa, District Court or the United States District Court for the Southern District of Iowa.

Administrative Rules: For Additional details on the rules governing the actions of the Office of Procurement and Distribution refer to 761 IAC, Chapter 20, Iowa Administrative Code, entitled "Procurement of Equipment, Materials, Supplies and Services".

Equal Opportunity: Firms submitting bids must be an "Equal Opportunity Employer" as defined in the Civil Rights Act of 1964 and in Iowa Executive Order Number Thirty-four.

Affirmative Action: The contractor (and also subcontractor, vendor, or supplier) is prohibited from engaging in discriminatory employment practices forbidden by federal and state law, executive orders and rules of the Iowa Department of Management, pertaining to equal employment opportunity and affirmative action. Contractor may be required to have on file a copy of their affirmative action program, containing goal and time specifications. Contractors doing business with Iowa in excess of $5,000 annually and employing 50 or more full time employees may be required to file with the Iowa Department of Management a copy of their affirmative action plan. Failure to fulfill these non-discrimination requirements may cause the contract to be canceled and the contractor declared ineligible for future state contracts or subject to other sanctions as provided by law or rule.

Targeted Small Businesses: The Iowa DOT seeks to provide opportunities for women and/or minority small business enterprises. To apply for certification as an Iowa Targeted Small Business, contact the Iowa Department of Inspection and Appeals (515-281-7357). Contractors shall take documented steps to encourage participation from Targeted Small Businesses for the purpose of subcontracting and supplying of materials.

Interest in Contract: No state or county official or employee, elective or appointive shall be directly or indirectly interested in any contract issued by the Iowa DOT, See Code of Iowa 314.2.

Records Audit: The contractor agrees that the Auditor of the State of Iowa or any authorized representative of the state, and where federal funds are involved, the Comptroller General of the U.S. Government, shall have access to and the right to examine, audit, excerpt, and transcribe any directly pertinent books, documents, papers, and records of the contractor relating to orders, invoices, or payments of this contract.

Iowa Department of Transportation
SUPPLEMENTAL TERMS AND CONDITIONS
For
Proposal 4618, A07-Medum Duty Single Axle Snow Removal Trucks
Proposal 4619, A11 Extra Heavy Duty Tandem Axle Snow Removal Trucks
Proposal 4620, A12 Heavy Duty Tandem Axle Snow Removal Trucks
Letting Date: December 1, 2010

Proposal Guarantee

Proposal guarantee of $20,000 is required on each proposal.

Specifications

Please make your bids as per the specifications that are applicable in the attached Spec. No. 24-A07-1110 or Spec. No. 5-A11-1110 or Spec. No. 14-A12-1110.

Exceptions or Equals

Any equipment being offered as an equal to the specified make/model must be submitted on the enclosed form Bidder's Request for Exceptions or Equal. The form must specifically state the requested equal and be accompanied by adequate supporting information to evaluate the request.

The Bidder's Request for Exceptions or Equal form must be received in 5 business days ***prior*** to the bid opening to evaluate and respond with the appropriate action. It is suggested that any requests for equal be submitted either by email or fax immediately upon receipt of the proposal in order to receive full consideration. Fair treatment to all vendors shall be the primary concern in evaluation of requests for equal, particularly those submitted just prior to the bid opening. **Do not submit Bidder's Request for Exception or Equal with your bid.**

Manufacturer's Rebate

If, as a result of this proposal, an agency of the State of Iowa becomes eligible for a manufacturer's authorized rebate, the full amount of the rebate shall pass to the agency without reservations by the bidder. If the rebate stipulates specific requirements for eligibility (such as order dates, delivery dates, etc.), the bidder shall, to the best of his ability, assist the agency in meeting the requirements.

Approved Brands

Brands listed have been pre-approved by the Iowa DOT. Equivalent brands may be bid, but if not previously tested may be subject to testing by the Iowa DOT prior to the award.

Product Literature

Two (2) complete sets of catalogs, specification sheets, or other literature giving detailed information about the item bid shall be included with the proposal. The items shall be identified in the literature by make/model name or number. Modifications or deviations from the printed literature or accessory items not covered shall be described by a written statement, unless included in the information supplied on the Detailed Information Sheet if included with this proposal.

Additional Information

If any additional information is required to properly evaluate the bid, the bidder shall furnish the requested information within three (3) working days after notification from Support Services.

Ties and Reservations

No ties and reservations by the bidders are permitted on this proposal.

Separate Bids

If the bidder wishes to quote prices on more than one model, bidder shall submit a separate schedule of prices for each model. Additional Schedule of Prices for each proposal must be submitted in the same envelope, but only one proposal guarantee is needed. If more than one Schedule of Prices for each proposal is offered, the difference bid proposals at each price shall be noted in writing (i.e.; marked 'Alternate Bid') or it will be assumed that the lowest bid meets specification and the higher bid will not be considered.

Optional extras may be bid as additions, in letter form, on a separate sheet attached to the proposal.

Bidder of Groups A & B

Only a licensed, new vehicle/truck dealer may submit proposals for Groups A & B by Iowa Code Section 322.3(1).

Vendors submitting bids for Groups A & B will be subject to a mileage accumulation of 1,000 miles on the truck odometer. Any miles over the 1,000 mile reading will be charged back to the appropriate vendor at the Federal vehicle rate of $0.50 per mile. Federal vehicle (as of Jan 1, 2010: $0.50 cents per mile, updated annually)

Bidders of Group C, Components

Vendors submitting bids on Group C (related equipment & installation) will be allowed a total of 300 miles of operation. Vendor is required to pick the trucks up in Ames, Iowa, perform the installation and redeliver the trucks to Ames, Iowa. The Department may consider arrangements for drop shipments. This arrangement requires the concurrence of the truck vendor. Excess mileage is subject to a charge of $0.50 per mile over and above the 300 miles allowed.

Iowa DOT Policy on Resident and Non-Resident Dealers:

Resident Special Equipment Dealer: May bid on a completed vehicle, providing the dealer is a licensed new motor vehicle dealer for the line make that is bid. If not licensed, the special body equipment dealer may bid on the special body and a licensed new motor vehicle dealer must bid on the new motor vehicle chassis.

Non-Resident Special Equipment Dealer: May bid on completed vehicle, providing the dealer is a **licensed new motor vehicle dealer for the line make bid, in the state where such dealer's place of business is located**. If not licensed, the special body equipment dealer may bid on the special body and a licensed new motor vehicle dealer must bid on the new motor vehicle chassis.

References: Code of Iowa, Chapter 322
Section 322.2(3)
322.2(7)
322.3(1)
322.4
Administrative Rule 761(420.1) (322)

Bid Clarification

Group A. Turn-key Trucks:

Bids for this group of trucks are to be bid as a complete ready to use unit, including truck cab-chassis and all snow removal equipment installed as specified in Specification No. 24-A07-1110 or No. 5-A11-1110 or No. 14-A12-1110. The completed trucks are to be delivered to the Iowa DOT main complex in Ames Iowa.

Group B. Cab-Chassis

Bids for this group of trucks are to be bid as a truck cab-chassis only as specified in the "Medium Duty Single Axle Truck Chassis" section of Specifications No. 24-A07-1110 or "Extra Heavy Duty Tandem Axle Chassis" section of No. 5-A11-1110 or "Heavy Duty Tandem Axle Truck Chassis" section of Specifications No. 14-A12-1110. The truck cab-chassis are to be delivered to the Iowa DOT main complex in Ames Iowa.

Group C. Equip. & Installation

Bids for this group are to be bid as for the complete supply and installation of all equipment specified in the "Medium Duty Single Axle Truck Chassis" section of Specifications No. 24-A07-1110 or "Extra Heavy Duty Tandem Axle Truck Chassis" section of Specifications No. 5-A11-1110 or "Heavy Duty Tandem Axle Truck Chassis" section of Specifications No. 14-A12-1110. The bid price must include the cost of picking up the cab-chassis at the Iowa DOT main complex in Ames Iowa, transporting them to the installer's normal place of business, installing the equipment and returning the completed ready to use truck back to the Iowa DOT main complex in Ames Iowa.

Contract Award

A contract may be awarded for any item or combination of items.

The sum of individual groups B and C will be compared to low bid group A. Six (6) percent holding cost for 12 week period will be added to the sum of B and C. Truck award will be based on the projected life cycle cost of the vehicle bid. Life Cycle Costing (L.C.C.) is a procurement technique which considers the total cost of ownership as will as acquisition price. The objective of L.C.C. is to insure that the vehicle procured will result in the lowest overall ownership cost to the State of Iowa during the life of the vehicle.

Life Cycle Costing (LCC)

It is the intent of the State of Iowa to award a contract to the vendor(s) whose bid results in the lowest total cost during the period of ownership of the vehicle(s) purchased. In determining the LCC of a motor vehicle, the costs shall be determined on the basis of the bid price, the resale value based on a usable life of twelve (12) years.

Resale Value:

Average finance value from National Market Reports Truck Blue Book. The value used will be of a comparable model 5-6 years old based on model changes less 50% (to project salvage value for 12 year old vehicle). Projected value will be discounted to present value at six (6) percent annual rate (PVF = 0.49697).

For the purpose of this procurement, the following contract award formula may be used:

LCC	**=**	**B - (R * 0.49696)**
LCC	=	Life Cycle Cost, Contract Award
B	=	Base bid (and options where specified)
R	=	Resale Value (where applicable), adjusted to present value.
0.49696	=	Present Value Factor, 6.0 percent per year for 12 years.

The formula is predicated upon the use of the following definitions, criteria, and resources:

Life Cycle Costing Example

The following is a fictitious example of LCC to determine the present value of total life cycle costs. Single or Tandem axle trucks meeting chassis requirements.

LCC	**=**	**60,000 - ((22,000*50%) * 0.49696)**	
B	=	Bid price:$60,000.00	
R	=	5-6 Year Old Resale Value/50%*0.49696	-5,466.56
LCC	=	Life Cycle Cost, Contract Award:	54,533.44

Contract Period

The successful bidder will be awarded a one (1) year contract with an option to renew for three (3) additional years in twelve (12) month increments. A price adjustment may be allowed on each extension but must not exceed the CPI, PPI, or appropriate index for adjustment as determined by the Iowa DOT. The adjustment must be pre-approved by the Iowa DOT, Office of Support Services, and Purchasing Sections.

Contract Quantities

The Iowa DOT will make a one-time purchase of the entire quantities of Item A.1 or combined B.1 and C.1 listed on these proposals. The actual options to be purchase listed in these proposals may vary based on Iowa DOT's needs. There are no guaranteed quantity options.

Contract Extension

Upon mutual agreement, the contract maybe extended under the same terms and conditions for a period of twelve (12) months.

Purchase Orders

A purchase order will be issued at the beginning of the contract period for multiple scheduled deliveries throughout the contract period.

Delivery Location

Material shall be delivered to the Iowa Department of Transportation, Repair Shop, 800 Lincoln Way, Ames, Iowa 50010. Contact person David Hunt at 515-239-1496.

Delivery Schedule

Contractor of Group A Turn-key Trucks shall be responsible for all phases of truck and related equipment procurement and installation. Contractor of Item 1 shall deliver trucks to the Iowa Department of Transportation, Ames Complex according to the following delivery schedule: Twenty-Four (24) Single Axle Turn-key Complete Trucks by 37 weeks after purchase order issue date and Five (5) Extra Heavy Duty Tandem Axle Turn-key Complete Trucks by 48 weeks after purchase order issue date and Four-Teen (14) Heavy Duty Tandem Axle Turn-key Complete Trucks by 46 weeks after purchase order issue date.

Payment will be made as completed trucks are delivered & pass equipment inspection.

Contractor of Group B Cab-Chassis Trucks shall deliver cab-chassis to the Iowa Department of Transportation Ames Complex according to the following delivery schedule:
Twenty-Four (24) Single Axle Turn-key Complete Trucks by 26 weeks after purchase order issue date and Five (5) Extra Heavy Duty Tandem Axle Turn-key Complete Trucks by 34 weeks after purchase order issue date and Four-Teen (14) Heavy Duty Tandem Axle Turn-key Complete Trucks by 36 weeks after purchase order issue date.

Payment for Group B will be per delivery schedule of Group B. Six (6.0) percent holding cost for 12 week period will be used to compare Group A to sum of Groups B and C.

Contractor of Group C Equipment and Installation shall pickup cab-chassis at the Iowa Department of Transportation Ames Complex, furnish and install related equipment and return completed trucks to the Iowa Department of Transportation Ames Complex. Delivery Schedule: shall be completed within 12 weeks of date they are made available according to the following delivery schedule of cab-chassis truck (Group B)

Invoicing & Packing List

Each Packing list and invoice must reflect only the merchandise relating to one purchase order. Multiple orders may be shipped together but each order requires individual invoicing and packing list stating purchase order number.

Equipment Inspection

A copy of the vendor's standard pre-delivery service check list shall be completed for each unit, signed by a representative of the organization performing the service inspection and delivered *with* unit. All units will be inspected by the State of Iowa after delivery. If the units are rejected because of deficiencies, it shall be the vendor's responsibility to:

1. Pick up the unit (s), make the necessary correction(s), and redeliver the unit(s) for reinspection, subject to mileage limits as stated in **Bidder of Group A & B** of page 2 of 7. The vendor must arrange to have the necessary work done or an approved schedule set within 48 hours (exclusive of Saturdays, Sundays, or holidays) after receipt of a written notification.

   The State of Iowa reserves the right to make minor corrections at the vendor's expense.

2. Should serious deficiencies be found, the State of Iowa may require vendor to pick up rejected unit(s) and replace it with a like unit.

3. If poor workmanship and/or minor deviations exist, the State of Iowa may withhold up to 20% of the contract price until the vendor has made all necessary corrections. Payment will be processed on units delivered to the State of Iowa that still require servicing by the vendor. The State of Iowa may withhold the full amount of the contract price if, in its opinion, the unit contains major deviations from the specification.

Liquidated Damages

Liquidated damages will be assessed for each calendar day and for each unit not delivered by the specified required delivery schedule. The IA DOT will consider allowance for extension of required delivery dates. This extension consideration will be only for things beyond the control of the vendor such as fire, flood, strikes, or Acts of God. **It will be the vendor's responsibility to notify the IA DOT and provide acceptable documentation at the first indication the delivery schedule will not be met. (No waiver is implied by this section.)**

Group A Trucks and Related Equipment: $25.00 per day unit not delivered by schedule stated on schedule of prices.

Group B Truck Cab-chassis: $25.00 per day per truck not delivered by schedule stated on schedule of prices.

Group C Related Equipment: $25.00 per day per unit not delivered by schedule stated on schedule of prices.

All contractors - an additional $10.00 per day per unit will be assessed to the contractor who delivers trucks and/or equipment with discrepancies not corrected within ten (10) days after notification by the Office of Equipment Services.

Payment

Payment for completed items purchased may be made by the state prior to delivery schedule unless noted elsewhere.

Payment will be based on unit quantities delivered. Invoicing must match accepted complete trucks and related equipment delivered. The Department suggests individual invoices provided with appropriate MSO and Application for Certificate of Title and/or Registration, delivered to Equipment Services upon delivery of each complete truck.

The Department may elect to pay Ninety percent of the unit contract price will be paid upon receiving the units until inspection of units can be accomplished typically written within ten working days after delivery. The remaining ten (10) percent of unit contract price will be paid when inspection occurs and/or all necessary repairs disclosed by inspection have been completed.

In the event that the equipment vendor (Group C) has not completed the trucks by the date designated on purchase order, the Iowa Department of Transportation may make partial or full payment to the truck chassis vendor according to Group A delivery schedule.

All payments are subject to the provisions contained in the section "Receiving and Inspection" by the IA DOT. Invoices must be mailed or hand carried to Equipment Support for timely processing.

Truck Pre-Delivery Service

Bids will be accepted only on makes of trucks that can be serviced by franchised dealerships of the manufacturer located within the State of Iowa. The manufacturer shall guarantee to furnish all warranty services gratis at franchised dealers within the State of Iowa.

Before delivery of any completed truck to the Department, vendor shall do a thorough pre-delivery inspection of each complete truck, to include the chassis and all installed snow equipment. Inspection shall be customized to reflect snow removal truck requirements, including hydraulic system individual pressure settings; a generic example is available from Equipment Services. A copy of this inspection, signed by the technician who does it, shall be placed in each truck left door pocket.

All chassis, body and snow equipment grease/lube fittings and all other fluids shall be serviced and/or topped off to full before delivery to the Department.

Parts of this servicing program may be performed at the manufacturer's assembly plant if proper facilities are available there. **Resident or non-resident contractors must perform pre-delivery and final servicing checkup, including final body clean-up, in the contractor's own shop or a facility approved by the Contractor.** Contractors shall furnish a complete servicing check list on above items with each vehicle at the time of delivery.

Prototype Inspections

Groups A, B, & C: Prototype inspection and approval of the truck will be made at the factory. An additional inspection will be made prior to the delivery of the trucks to the Iowa DOT. Final inspection will be performed on each unit upon delivery to the Iowa DOT.

An inspection and approval will be required of each phase of the truck package assembly. This will include a fully completed and operational prototype of the truck with hydraulic system installed, snow plow lift frame installed, dump body installed, tailgate spreader installed and supplemental specifications. Final inspection will be performed on each unit upon delivery to the Iowa DOT.

D.O.T. Data Sheets

Prior to the delivery of the first vehicle by the successful bidder, an Iowa Department of Transportation "Data Sheet" must be completed and forwarded to Equipment Services. Data sheets will be provided to the successful bidder. The "Data Sheets" includes part numbers and models for several common replacement items such as fuel system components, starter, filters, numbers, shocks, axles, etc. Until the completed Data Sheet is received, payment on delivered units will be withheld.

Receiving and Inspections by Iowa D.O.T.

Units must be delivered in accordance to the governing specification. All units will be inspected by the State after delivery. If the units are rejected because of deficiencies, they shall be the vendor's responsibility to:

1. Pick up the unit(s), make the necessary correction(s) and redeliver the unit(s) for reinspection. The vendor must arrange to have the necessary work done or an approved schedule set within 96 hours (exclusive of Saturdays, Sundays and holidays) after receipt of written notification from Equipment Services. The vendor will be subject to a $.50 charge per mile accumulated on the odometer.
   Otherwise,

2. The State may make the corrections at the vendor's expense.

A copy of the vendor's standard pre-delivery service check list shall be completed for each unit, signed by a representative of the organization performing the service inspection and delivered **with** the unit. Successful vendor will be provided with examples of what the IA DOT requires for these pre-delivery checks.

If poor workmanship and/or minor deviations exist, the State may withhold up to 20% of the contract price until the vendor has made all necessary corrections. Payment will not be processed on units delivered to the State that still require servicing by the vendor. The State may withhold the full amount of the contract price if, in its opinion, the unit contains major deviations from specification.

Request for payment for partial delivery will be reviewed and honored when appropriate and when properly documented.

IOWA DEPARTMENT OF TRANSPORTATION

OFFICE OF SUPPORT SERVICES

EQUIPMENT SERVICES SECTION

FY'2011

SPECIFICATIONS

for

37,000 LB. GVWR

SINGLE AXLE SNOW REMOVAL TRUCK

TABLE OF CONTENTS
FOR
SINGLE AXLE SNOW REMOVAL TRUCKS

STANDARD SPECIFICATIONS
for
SNOW REMOVAL TRUCKS

The following specifications shall apply to common requirements for all components included in the purchase package of snow removal trucks. Included are requirements for the following:

. . . . . .

1. EXCEPTION AND/OR APPROVED EQUAL REQUESTS

A. All specified chassis equipment is to be OEM installed, either as standard equipment, a line installed option or factory authorized DSO/SE installation unless otherwise specifically stated.

B. Any items that are not available as chassis OEM installations, and/or any other component, installation, item, or equipment that a vendor wishes to bid differently than requested in these specifications will require review and approval from Equipment Services. Vendor shall submit such requests on the Exception and Approved Equal Request form according to the guidelines established in the bid package. See “Supplemental Terms and Conditions” under “Exceptions or Equals” for more details. Please include all literature, technical data and/or other ‘proof’ as needed to support such a request.

C. All requests must be received by Equipment Services within the time period specified so as to allow adequate time for review and dissemination of request status to all other vendors if required. Purpose is fairness to all vendors. Late requests cannot be considered.

D. Final approval of any vendor or manufacturer's equipment may require a demonstration, current user list, and/or tour of their facility to determine compliance and acceptability. Vendors shall make available, upon request and within one week of notification by the Department, any or all of the following:

1. A demonstration. A typical and similar same model machine and/or component shall be provide to the Department for up to 2-working days unimpeded evaluation. A physical use demonstration may be conducted if applicable at a Department Maintenance Facility; equipment will be operated by Department personnel.

2. Contact list. Name, address, and phone number of other customers using the same equipment within the State of Iowa that can be contacted and an unescorted visit arranged. Intent will be to see the equipment in a working environment and talk to the operators and/or owners.
3. A facility tour. Vendor shall provide a list of suitable times to the Department within regular daytime work hours when an inspection tour of their installation and/or manufacturing facility would be convenient.

E. All costs associated with providing any or all these items are the sole responsibility of the vendor. Inability to comply with any or all will be adequate reason for bid rejection.

F. The Department reserves the right to reject, without reservation and in our opinion, any equipment it deems:

1. Not capable of conveniently and/or economically performing the work required.
2. The vendor has limited or no experience with, to include components, parts, pieces or items that, previous to this bid, the vendor has not marketed, manufactured, or installed, generally meaning it is not a normal production item, installation and/or function in their facility.
3. Does not have an adequate service and support infrastructure in place to provide continuing long term service and support for the product(s) being proposed.

G. The Department of Transportation reserves the right to waive compliance on minor technicalities on this specification; to reject any or all bids; and to accept that bid which, in the opinion of the Department, is in the best interest of the State.

H. All ratings, dimensions, weights, operating systems, and other applicable apparatus shall be according to/in compliance with ISO/SAE Standards and all applicable laws of the State.

2. MANUALS, SERVICE PUBLICATIONS, & TECHNICAL SUPPORT

A. Manuals and Service Publications

1. A complete set of manuals shall be provided for each location receiving a new truck. It is preferred that all publication be a in CD-Rom format. However, the Department will accept paper manuals or a combination of paper and CD (i.e., paper operators manual and CD service and parts manuals). Vehicle payment may be withheld until a complete manual set is received for each specific vehicle.
2. Chassis set shall be all inclusive, containing all available chassis publications, to include at a minimum an operator's manual, service/repair instruction set (must detail all components), a complete fully illustrated parts manual (must include all components) and wiring diagrams.
3. As an alternative to CD or paper Service and Parts, chassis vendor can provide a perpetual (for as long as the Department own the truck) statewide subscription and access to their OEM electronic service and parts system. Unlimited state users. System must be available 365 days, 24 hours a day.
4. Each chassis shall be delivered with a paper line set ticket.

5. Snow removal equipment set shall be all inclusive, containing accurate and detailed publications on all components. They shall include at a minimum operator's manuals, service and repair instructions and complete fully illustrated parts lists.
6. CD publications must be provided in a protective case with proper identifying labels. Paper publications must be bound into manuals or installed in binders when delivered to the Department; boxed, shrink-wrapped or otherwise unbound loose pages are not acceptable.
7. In addition to a manual set for each location, 10 additional all inclusive sets must be delivered to Equipment Services. These sets will be distributed to District Mechanics, Purchasing, Warehouse, Central Repair Shop, etc. to provide long term diagnostic, repair, and parts support
8. The Department requires these service publications to include update service at the same frequency and caliber as received in a franchised dealership, delivered to or performed at the truck's assigned field location.

B. Technical Support

1. The Department requires that the successful vendor(s -chassis and snow equipment) provide basic diagnosis and repair training for all electronic systems and components on their trucks. This shall include but is not limited to: engine, transmission, chassis electrical, cab environment, spreader controls, etc.
2. All training shall be supplied gratis and at the request of the Department. If training must be conducted at the vendor’s facility, or a facility as directed by them other than a Department facility, vendor shall be responsible for all costs, including but not limited to, transportation, meals, and lodging, for all Department personnel needing training.
3. In addition to this basic diagnosis and repair training, the Department’s six (6) District Mechanics and one (1) Repair Shop Mechanic shall be trained and certified to do complete and in-depth diagnostic testing, adjustments, and programming on all systems, to include but not limited to: engine parameters, transmission parameters, chassis electrical system parameters, and all cab environmental parameters. Any and all required diagnostic tools, electronic components, and/or computer software or passwords must be provided. On going training shall be supplied to the Department at the same frequency and caliber as received in a franchised dealership.

3. VEHICLE IDENTIFICATION SHEET

A. Each truck shall be delivered with an identification sheet in the cab listing the following information: 1) The truck VIN number, 2) the Department P.O. number. An example would be: VIN: 1HTWHADT2BJ077094
P.O. 216047 - Lines 1, 2, 3, 4, 5.

B. Each set of truck keys (2-sets required) shall have a key tag identifying the last 8 digits of the VIN, P.O. number and P.O. line item and optional equipment.

4. REMOVED COMPONENTS

All components removed from Department truck chassis and not re-installed or directly re-used on a Department chassis shall be shipped to the Department Central Repair Shop in Ames, IA. Examples would include mufflers, exhaust components, fuel tanks, brackets, tail lights, and any or all other components.

5. ELECTRONIC SHIELDING - RFI PROTECTION

A. Trucks will have 2-way land mobile radio transceivers installed by the Department. These transceivers will operate in high band and 700/800 (150 to 174 MHz and 700/800 MHz). Antennas will be mounted on the roof or highest plane surface of the vehicle. All vehicle electronic circuits including but not limited to ignition, AM/FM radio receivers, computers, emission controls, alternative fuel electronic controls, regulators and/or snow removal equipment controls shall be designed to suppress, bypass or otherwise prevent interference from affecting the Department transceivers. Also, the vehicle electronic equipment shall be unaffected by the radio frequency energy generated by the (up to 125 Watt output) transmitter portion of installed transceivers.

B. The vehicle electrical system shall be designed so that the vehicle shall not degrade the 2-way radio receiver performance. The entire electrical system shall be designed so that effective sensitivity of the VHF or 700/800 MHz FM receiver shall not require more than 0.5 microvolt (-111 dbm) to produce 12 db or greater SINAD. The effective sensitivity shall not exceed 0.5 microvolt for all modes of operation, which shall include but not be limited to, engine off, engine on, (from idle to full throttle), and all vehicle systems or combinations thereof.

C. Vehicles from each group of make and model manufactured may be tested by the Department upon delivery. These vehicles and the remainder of the order will not be accepted until they comply with these RFI requirements.

D. The Department currently utilizes multiple frequencies from 150-163 MHz and 700/800 MHZ and will test RFI in these bandwidths.

6. PAINT & COATINGS

A. All equipment shall be thoroughly cleaned and completely coated with a high quality corrosion resistant finish.

B. Truck cab/chassis unit:

1. Truck cab shall be painted with a two step factory basecoat - clearcoat process because of the increased durability this process gives.
2. Frame and undercarriage shall be completely painted with a high quality black single step finish to provide maximum corrosion protection. Dealer may be required to extensively touch-up factory undercarriage paint if it is deemed inadequate to provide good corrosion protection.
3. NO bare ferrous metal components shall be visible on the chassis or any components, OEM or outfitter installed. This IS a snow removal salt spreading truck!

C. Outfitter installed equipment:

1. All manufactured ferrous equipment attached to the Department chassis shall be sand or media blasted to remove all mill scale, oils, dirt, rust, shipping primer and/or other contaminants from the surfaces. This means the front plow hitch, dump body, any wing, any underbody plow or scraper, valve enclosures, and any other component that is subject to corrosion.

2. All snow removal equipment must be powder coated, the only exception will be the dump body; it's finish is detailed below. Powder coating is required because of the durability of this product. The Department requires any and all components that can be powder coated to be, including the dump body if possible. Items shall be powder coated as individual components prior to any assembly.
3. If the dump body cannot be powder coated, it must be completely painted, coated, and rust proofed. See additional details at the end of the Dump Body specification section. Visible exterior surfaces shall be painted to match the truck cab.
4. Visible body parts shall be painted with a premium quality polyurethane finish, consisting of approximately 2 mils dry film build corrosion resistance primer top coated with 2-3 mils dry film build paint. Primer shall be a light gray high solids low VOC polyurethane primer (PPG DPU 174 or approved equal). Paint must be multiple coats of high solids low VOC polyurethane enamel paint (PPG Delta DFHS or approved equal).
5. All visible finishes shall be smooth, shiny, and free of runs, overspray, and/or other defects.
6. Minimum finished application thickness, 4 mils dry film build.
7. Powdercoat, paints, and primers used shall be 100% lead and chromate free. MSDS on products used shall be made immediately available to the Department upon request.

D. Regardless of finish type, these color requirements shall apply:

1. ORANGE REQUIREMENT - Standard Iowa Department of Transportation orange color is "OMAHA ORANGE". Known acceptable colors are International 0311, Freightliner N6389EA, GM 9W4; other manufacturer's color must be approved. All components used in the fabrication of a Department truck that are required to be coated orange shall be color matched to the OEM chassis cab color.
2. BLACK REQUIREMENT - All components used in the fabrication of a Department truck that are required to be coated black shall be matched to PPG DAR9000.

E. After installation and before final inspection, all installed component finishes shall be touched-up to provide a uniform 'break-free' finish. Frame and underneath shall be thoroughly inspected for bare metal and appropriate corrective action shall be taken to provide maximum corrosion resistance.

F. NO bare ferrous metal components shall be visible on the chassis or any installed components. This IS a snow removal salt spreading truck!

7. ELECTRICAL

A. All supplemental electrical equipment shall be installed in a workmanlike manner. Where available, factory chassis circuitry has been provided and must be utilized.

B. All electrical wiring shall be enclosed in a protective loom cover or conduit, supported approximately every 16 inches to frame or body members. All body wiring shall be supported in a welded-on stainless steel or other non-corroding conduit the length of the underside of the dump body. Body conduit shall be sealed with RTV silicon sealer at both ends.

C. Stranded wire shall be soldered (tinned) before inserting and attaching individual wire to terminals. All connector ends (spade, ring, etc.) are to be soldered to the wires.
D. Scotch-Loc fasteners and/or crimp butt connectors are not acceptable for any connection unless specifically stated.
E. All wiring to lamps or other electrical devices shall be stress relived with a clamp securing the loom and wiring within 3 inches of the lamp/device and include 4 inches of wire slack to allow future wire repair.
F. All wiring shall have a minimum 12 inches of looped slack around the hoist pivot point to accommodate raising the dump body.
G. All cables going through the truck cab metal that are not part of CPC connectors shall required a rubber grommet and/or metal strain relief clamp. Wiring in a protective loom cover or in conduit is considered insulated.
H. Electrical connections subject to constant exposure shall be factory potted or sealed with silicone RTV to prevent corrosion.
I. All plug-in connectors and receptacles shall be liberally coated with a corrosion preventative dielectric lubricant, as in Truck-Lite NYK77 compound No. 97940 or equal.
J. All grounds shall return to OEM chassis ground lugs.
K. Unless otherwise specified all wiring splices and connections shall be soldered and insulated with shrink tubing. All cable couplings and receptacles shall be sealed with a dual wall flexible shrink tubing. Shrink tubing used inside cab area shall be standard (no internal sealant). Shrink tubing used outside cab area shall be dual wall with an internal sealant.

8. THREADED FASTENERS

A. All threaded fastener components (bolts, washers, nuts) with a diameter designation greater than or equal to SAE 1/2 inch shall be of minimum grade 8 composition. Nuts shall be all metal self-locking, lock washers are not acceptable. A minimum of two bolt threads must extend through a nut. All components shall have grade identifier marks and a registered manufacturer's logo.
B. All threaded fastener components (bolts, washers, nuts) with a diameter designation greater than or equal to SAE 1/4 inch up too less than SAE 1/2 inch shall be minimum grade 5 composition. Nuts shall be self-locking, either poly-lock or all metal, lock washers are not acceptable. A minimum of two bolt threads must extend through a nut. All components shall have grade identifier marks and a registered manufacturer's logo.
C. All threaded fastener components (screws/bolts, washers/lock washers, nuts) with a diameter designation less than SAE 1/4 inch shall be minimum grade 2.

9. WARRANTY

A. TRUCK CHASSIS: The manufacturer shall guarantee to furnish all warranty services gratis at franchised dealers within the State of Iowa. From the date the Department assigns this equipment to it's requesting location, the manufacturer and/or it's representative shall provide a no deductible warranty (less normal maintenance items) for:
1) General overall truck, all-inclusive, minimum 1 year/umlimited miles.
2) Engine, minimum 3 year/150,000 miles. Must include all electronics, injectors, turbocharger, air compressor, and water pump.

3) Drive train and axles, minimum 2 years/unlimited miles. Must include transmission, flywheel or flex plate, clutch or torque converter, drive shafts and hangar bearings, differential(s), power divider, housing(s), bearings, wheel ends, and steering gear(s).
4) Cab structure integrity and corrosion (rust through), minimum 5 years.
5) Frame integrity, rails, and crossmembers, minimum 5 years.

B. SNOW REMOVAL EQUIPMENT: From the date the Department assigns this equipment to it's requesting location, the manufacturer and/or it's representative shall provide a no deductible all-inclusive warranty (less normal maintenance) for a minimum 1 year/12,000 chassis miles, whichever occurs first.

1. Snow removal equipment warranty shall be provided at the equipment's assigned location within the State of Iowa. If equipment must be removed from the assigned location for repair or replacement, equipment manufacturer must reimburse the Department our standard hourly/mileage rental rate for the entire time the equipment is gone from the State facility.
2. If common repairs are required, the State will work with the vendor to the best of our ability to group vehicles together at a common location to expedite the repairs. This will, however, be done at the discretion and convenience of the Department.
3. If through common agreement between the assigned location and the providing vendor the Department agrees to complete warranty repairs for the vendor, the Department will bill the providing vendor for all labor, shop supplies, and parts not supplied by the vendor to complete the repair. All shipping for new parts sent and warranty return parts shall be paid by the vendor. A Department Cost Memorandum Report (similar to an invoice) detailing all charges will be supplied to the vendor for payment.

C. If any standard retail warranty exceeds any of these minimum terms, the standard warranty shall apply. A warranty certificate or card shall be supplied for each vehicle.

10. PROTOTYPE TRUCK for VIEWING

A. A snow removal truck from the Department's most recent previous purchase will be made available for prospective vendors to view and analyze. Truck will be available at the nearest Department Maintenance facility that received one; truck may not be removed from the facility grounds. Vendors are responsible for their own costs if any are incurred to see the truck. The Department reserves the right to move and/or use the truck in an emergency. An appointment must be made through Equipment Services. Contact Tim Nordholm at 515-239-1607.
B. Truck will illustrate the minimum acceptable design, subject to new specification changes. Any deviation from the design will require review and approval by the Equipment Services prior to award of a contract.
C. Fabrication and installation of systems must be made in contractors own shop within the State of Iowa or other facility approved by the Iowa Department of Transportation.

11. PILOT INSPECTIONS

A. The Department requires the ability to thoroughly inspect, test, and approve the bare chassis and first fully completed and operational truck, hereafter identified as the 'pilot'.

B. Chassis: Vendor shall notify Equipment Services upon completion of the pilot chassis. Vendor may be required, at the Department's discretion, to make arrangements for an inspection of the chassis at the point of manufacture. If an inspection is felt necessary and/or warranted, successful vendor shall make the appropriate arrangements. The Department will be responsible for all costs for all employees assigned to conduct the inspection.

C. Completed Truck: Vendor shall notify Equipment Services upon completion of the pilot chassis outfitting with snow equipment as ordered. Arrangements shall be made for the Department's mandatory inspection at the place of outfitting. The Department will be responsible for all costs for all employees assigned to conduct the inspection.

D. A written document of all inspections findings will be provided to the vendor and/or his outfitter. Discrepancies and/or findings of non-compliance will be listed and must be corrected and/or addressed to the satisfaction of the Department before the rest of the trucks are built or outfitted.

12. PRE-DELIVERY INSPECTION

A. Before delivery of any completed truck to the Department, vendor shall do a thorough pre-delivery inspection of each complete truck, to include the chassis and all installed snow equipment. Inspection shall be customized to reflect snow removal truck requirements, including hydraulic system individual pressure settings; a generic example is available from Equipment Services. A copy of this inspection, signed by the technician who does it, shall be placed in each truck left door pocket.

B. All chassis, body and snow equipment grease/lube fittings and all other fluids shall be serviced and/or topped off to full before delivery to the Department.

13. POST-DELIVERY INSPECTION

Once a completed truck is delivered to the Department in Ames, it will again be thoroughly inspected by Central Repair Shop personnel before it is approved for release to it's requesting location. All problems and deficiencies will be noted. Minor problems will be corrected by Department personnel and all parts and labor costs will be billed back at the prevailing Repair Shop rate to the providing vendor at the conclusion of the deliveries. (Minor problems should be considered things like low fluids, non-working lamps, missing wire ties, and other similar items that can be quickly corrected by Department personnel so as to not delay delivery of the truck). All problems considered not minor will be the responsibility of the providing vendor to correct within 48 hours of notification by the Department unless other arrangements agreeable to the Department are made. Any odometer mileage in excess of 100 miles after initial delivery to Ames needed to accommodate repairs will be billed back to vendor at current Federal vehicle rate (as of Jan 1, 2010: 50 cents per mile, updated annually).

14. DATA SHEET

Successful vendor shall complete a Department Vehicle Data Sheet and deliver it to Equipment Services on or before delivery of the first truck. Data sheet details the OEM part numbers for the majority of parts and serviceable components of the chassis, such as filters, belts, hoses, brakes, etc. A copy of this form may be obtained from Equipment Services in either an electronic Excel format or via fax.

SPECIFICATION
for
SINGLE AXLE TRUCK CHASSIS
37,000 lb. GVWR

1. GENERAL INFORMATION AND DIMENSIONS

A. Conventional set-forward front axle design high-height cab suitable to provide adequate headroom, seat travel with the specified air-ride seats, and operator comfort with all specified snow equipment installed.
B. Nominal 80-inch wide cab with over 56 inches floor-to-headliner height, minimum 18 inches operator's seat-to-floor height, and minimum 70 inches shoulder room dimension.
C. One-piece tilting front-end engine access.
D. Bumper-to-Back-of-Cab (BBC), 107 to 111 inches.
E. Wheelbase (WB), 177 to 184 inches.
F. Cab-to-Axle (CA), 102 inches.
G. After-Frame (AF), 55 inch minimum.

2. ENGINE & RELATED COMPONENTS

A. Diesel: Premium turbocharged, 4-stroke liquid cooled, inline 6-cylinder only, fully electronic controlled, cast-iron skirt block with replaceable (wet) cylinder inserts.
B. 7.6 to 8.3 liter displacement.
C. Certified power rating minimums: 250 horsepower; 660 lb/ft torque; 420 lb/ft clutch engagement torque.
D. Life Miles Rating: Engine shall meet or exceed a B50 rating of 500,000 miles.
E. Magnetic oil drain plug.
F. Air intake filtration: Two dry elements meeting engine manufacturer’s optimum filtration requirements.
G. Air filter housing snow valve, operable from the operator’s position, selector to allow engine intake air to be selected between the standard outside air source or diverted and drawn from under the hood. Designed to prevent air filter clogging in severe snow storms.
H. Radiator: Largest capacity available for provided engine. If an optional increased cooling capacity option (additional row(s) of tubes/fins) is available, it must be provided. If an optional corrosion resistant radiator coating or treatment is available, it must be provided.
I. Antifreeze: Extended Life testing to a minimum -35 degrees Fahrenheit. Low coolant warning light and alarm.
J. Fan: Positive direct drive on-off temperature controlled 2-speed clutch type with residual torque device for disengaged fan speed. Emergency mechanical failure lockup (on) provision. Viscous not acceptable.
K. Fan override switch, driver control, allowing driver to lock fan on.
L. Hose clamps: Constant torque or Perma-Shrink, all coolant hoses.
M. Throttle/Cruise control: Dash or steering wheel mounted electronic adjustable.
N. Hydraulic Pump Drive Apparatus: Engine crankshaft front drive adapter plate suitable for installation of a Spicer No. 1310 accessory drive connector. Suitable chassis will have clearance provisions for a direct front PTO driveshaft below the front end structure and engine cooling/air intake components. Driveshaft through a radiator cut-out is not acceptable.

O. Engine warning/shut down system: Audible buzzer and lamp warning for high engine temperature and/or low engine oil pressure with automatic engine shut down feature. System must have an emergency override.
P. Engine governor control wiring harness, type suitable to allow low cost Department installation of remote mounted engine speed control device(s). Necessary to power PTO driven accessories and/or hydraulic pump.
Q. Final engine management system electronic parameters will be determined at time of bid award.

3. TRANSMISSION

A. Allison 3500RDS wide ratio 6-speed automatic transmission.
B. Synthetic transmission fluid.
C. Magnet in transmission oil pan.
D. Water-to-oil transmission cooler, Modine or equal.
E. ECU in cab.
F. Dash mounted temperature gauge.
G. Dash mounted push button type gear selector with ‘Mode’ select.
H. Alternate transmission programming: ‘Snow Plow’ mode in lieu of ‘Economy’ mode. Programed to allow upshifts only at full engine RPM, regardless of throttle position.

4. FRONT AXLE AND SUSPENSION

A. Wide-track 14,000 - 14,600 lb. rated capacity - Dana Spicer or Meritor.
B. Set-Forward Only. Axle set-back not to exceed 32”.
C. Wet front oil seals, Stemco or equal.
D. Synthetic hub oil.
E. Multi-leaf spring suspension rated 16,000 lb. with highest deflection rate available or parabolic tapered leaf rated 14,000 lb. capacity with shock absorbers and auxiliary rubber booster springs rated 2,000 lb. capacity each.

5. REAR AXLES AND SUSPENSION

A. Standard manufacture 23,000 lb. rated capacity.
B. Synthetic differential oil.
C. Magnetic drain plug.
D. Driver controlled differential lock. Automatic speed disengage feature. Dash mounted switch and indicator lamp.
E. Multi-leaf spring suspension rated minimum 23,000 lb. with highest deflection rate available.
F. Overload devices, spring or rubber, 4,500 lb. rated.
G. Axle Ratio adequate to meet Gradeability, Rear Wheel Torque, and provide sustained 70 MPH highway cruise at GVWR. Final determination to be at time of bid award. Estimate 6.14.

6. WHEELS AND TIRES

A. Front Wheels: Heavy service (0.5" thick) 9.00 inch steel hub piloted Budd style 10-bolt. White powdercoat finish. Nylon wheel guards.
B. Front Tires: Michelin XZY-3, no exceptions without pre-approval. 315/80R22.5 LR "L" tubeless steer tread. Tires cannot be speed restricted below 70 mph.
C. Rear Wheels: Heavy service 8.25 inch steel hub piloted Budd style 10-bolt. White powdercoat finish. Nylon wheel guards.

D. Rear Tires: Michelin XDE M/S*, no exceptions without pre-approval.11R22.5 LR "H" on/off road tubeless M&S drive tread. Tires cannot be speed restricted below 70 mph.

7. FRAME

A. Single straight nominal 10-inch high rails - laminated, variable depth, or splayed rails are not acceptable.
B. Minimum 120,000 PSI Heat Treated Alloy Steel.
C. Resistance to Bending Moment (RBM): Minimum 2,130,000 in/lb.
D. Section Modulus (SM): Minimum 17.7 cu/in.
E. Integral front frame extension: Minimum 20 inches in front of grille.
F. Minimum ground clearance: There shall be a minimum 12 inches ground clearance under any frame mounted components, such as the fuel tank and/or its mounting brackets, steps, air tanks, battery box, etc.
G. Cab steps: All steps shall be minimum of 28 inches long, non-slip serrated top Bustin style aluminum grating. Steps required on both sides. If any step is an integral part of a fuel tank, grating area must be at least 14 inches long. Additional steps may be required if outfitting requires relocating standard steps or fuel tank. See Optional Equipment sections.
H. Front Bumper: Manufacturer's standard painted.

8. BRAKES

A. Dual full air anti-lock system rated at or to exceed axle GVWR requirements. If extended warranty is available for 'one-brand' system, it shall be optioned and provided.
B. Cab mounted low air pressure warning buzzer and gauge.
C. Dry reservoir tanks - pull cable on wet tank.
D. All brakes must be cam with non-asbestos linings.
E. Minimum 13.2 CFM compressor.
F. Heated air dryer, Bendix AD-IP only. Air dryer must be positioned to be easily accessible and serviceable, even after snow equipment installations.
G. Installation of the air tanks and/or dryer shall not inhibit the installation of snow removal equipment anywhere underneath the truck or behind the cab (clear frame).
H. All chambers must be long-stroke premium quality Haldex. Rear chambers to be corrosion resistant epoxy coated and sealed, Anchorlok LifeSeal only.
I. Parking brake: Spring set rear wheel brake chambers.
J. Parking brake alarm - alarm to sound if door is opened and park brake is not set.
K. Automatic slack adjustors: All wheel positions, premium Haldex brand.
L. Tractor brake system and combination valve for trailer air brake towing with full trailer anti-lock provisions. Air lines with glad-hands ran to rear of frame rail set-up for trailer towing. Fully installed, ready for use.

9. EXHAUST SYSTEM

A. Vertical stack on right-hand side with sweep elbow. Sweep to be approximately 6-8 inches above top of cab.
B. Stack must be shielded the full height of the cab.
C. Exhaust components/after-treatment-device(s) must be shielded. Truck will be used on and off road, sometimes in tall grass. Exhaust system component temperature and/or vapors temperature shall not be high enough to ignite vegetation.
D. Driver selectable manual regeneration control in cab.

E. Exhaust system design, components, and/or after-treatment-device(s) shall not hinder the installation of snow removal equipment anywhere underneath the truck or behind the cab (clear frame). System component placement must be approved by Equipment Services and the snow equipment outfitter.

10. ELECTRICAL

A. Gauges; dash mounted, easy operator viewing, to include at a minimum: Oil Pressure, Coolant Temperature, Air Pressure, Speedometer, Voltmeter, Fuel, Tachometer, Air Intake Restriction Indicator, Hourmeter.
B. Restriction indicator shall be dash mounted, providing graduated intake system restriction increments from 8 to 20 inches water (Filter Minder 3781-325 or approved equal).
C. Hourmeter shall be electronic, wired to provide a true hours-of-operation figure (either alternator excited or engine oil pressure sensor activated). Key-on activated meter is not acceptable.
D. Fault codes/blink codes displayed in instrument cluster. No scan tool required to retrieve and view codes.
E. Power-point 12-volt receptacle.
F. Ignition switch: Automotive key with accessory position. 2-keys provided.
G. Turn signal switch: self-cancelling.
H. Body builder harness connector for outfitter installed body lights.
I. Pre-trip CDL light inspection switch. Cycles lights while driver walks around truck.
J. Factory trailer cable (separate stop and turn lamps) with electric trailer brake accommodation package with trailer anti-lock brake feed-back circuit (30 amp fuse and relay) ran to end of frame rail, less connector(s). Electric trailer brake package to include cab connections for outfitter installed controller. 7-wire connector with round bullet contacts provided and installed by upfitter.
K. Radio: AM/FM/Weatherband stereo.
L. Clock: Electronic digital, visible day or night, may be an integral part of radio.
M. Courtesy lamps: Dome lamp and door hinge pillar or under dash courtesy lamps to illuminate rocker panel and cab step areas.
N. Air Horn(s). If top of cab mounted, must include snow cover(s).
O. Windshield wiper system: Electric with intermittent operation feature. Electric washer pump. If a heavy duty or severe service wiper system option is available, it must be included. Headlights to automatically go ‘ON’ whenever wipers are activated. If wipers are running when park brake is activated, they shall automatically go the lowest intermittent speed.
P. Electrical protection: Manual reset circuit breakers in lieu of applicable fuses.
Q. Alternator: pad mounted minimum 160 Ampere.
R. Four batteries, maintenance free, minimum 2600 CCA @ 0 degrees Fahrenheit. Non-splice battery cables. Dimensional size and specific mounting of battery box shall not hinder the mounting of snow removal equipment, either by the outfitter or later by the state. If the OEM battery box dimensional size and/or mounting is cause for concern, vendor shall work out a mutually agreeable solution with the outfitter and the state before bidding.
S. Chassis shall be provided with fully integrated OEM chassis wiring circuits for all add-on snow truck requirements. Switch circuits will be either a battery or ignition type, controlling power module through multiplex wiring. Power module(s) must be mounted in cab.
T. Multiplex system shall allow panel switches and indicators to be moved and re-mapped. It shall also allow limiting parameters to be set for each if required.

U. The lamps and switches shall be labeled and function as follows:

LAMPS & ALARMS			
1.	Hydraulic Filter Bypass Lamp.		Green Bezel. Alarm - Five short
2.	Hyd Low Oil/High Temp Indicator Lamp.		Amber Bezel. Alarm - Three Long
3.	Body Up Indicator Lamp.		Red Bezel. Alarm - Constant
BASE SWITCHES			
4.	Plow Lights.	Battery - latched.	DPDT, 2 position, ON/ON.
5.	Amber Revolving Light.	Battery - latched	SPST, ON/OFF.
6.	Wing Light.	Ignition - latched	SPST, ON/OFF.
7.	Spreader Light.	Ignition - latched	SPST, ON/OFF.
8.	Taillight Puffer.	Ignition - latched	SPST, ON/OFF.
9.	Strobe Light.	Ignition - latched center stable	DPDT, 3 position, ON/OFF/ON.
10.	Winter/Summer.	Ignition - latched	DPDT, 2 position, ON/ON.
11.	Extra	Ignition - latched	SPST, ON/OFF.
12.	Blank	No switch installed - for future use.	
OPTIONAL SWITCHES			
13.	Spread Right.	Ignition - latched	SPST, 2 position, ON/OFF.
14.	Air Bag Assist - Wing	Ignition - latched	SPST, ON/OFF.
15.	Tire chains	Ignition - latched	SPST, ON/OFF.
16.	Tarp	Ignition - momentary center stable	DPDT, 3 position, ON/OFF/ON.
17.	Zero Velocity - L / R	Ignition - momentary center stable	DPDT, 3 position, ON/OFF/ON.
18.	ZV deflector - up/dn	Ignition - momentary center stable	DPDT, 3 position, ON/OFF/ON.
19.	ZV head - up/dn	Ignition - momentary center stable	DPDT, 3 position, ON/OFF/ON.

V. Optional switches must be provided as indicated when the specific option is ordered. If the option is not ordered, the switch position shall have a blank cover plate, but the module shall still contain all functional requirements to allow a switch to be added and programmed at a later time.

W. The Low Oil/High Temp Indicator Lamp shall operate in conjunction with the temperature and level sender installed in the hydraulic reservoir. See Hydraulic System specification. When activated this lamp and alarm shall be constantly on until the oil temperature is reduced or the oil level raised.

X. The Body Up Indicator Lamp shall function as a dump body height warning system in both the Winter and Summer mode. In Summer mode it shall constantly illuminate whenever the body is raised. In Winter mode, working through an adjustable angle mercury switch, this system shall also include a flasher and audible alarm that will engage when the body attains the pre-set height adjustment of the mercury switch. Alarm must be loud enough to be heard over truck noise.

Y. The Winter/Summer switch shall control power to the spreader control and dump body height warning circuit. In the Winter mode it will allow power to the spreader control ON/OFF switch and power the height warning feature of the dump body up lamp circuit, causing both to function as designed. In the Summer mode, it will not allow power to the spreader control switch or the dump height warning circuit.

Z. Factory integrated OEM 2-way radio wiring circuits shall be provided, requiring 3 conductors. The conductors shall be: One 20-amp direct battery feed, one 5-amp 12v ignition feed, and ground wire. Wiring shall terminate in headliner overhead console.

11. FUEL SYSTEM

A. Fuel tank: Single tank, non-polished aluminum, minimum 100-gallon fuel capacity, left side mounted under cab, with integral step(s). Stainless steel mounting straps.
B. Dimensional size and specific mounting of tank shall not hinder the mounting of snow removal equipment, either by the outfitter or later by the state. If the OEM tank dimensional size and/or mounting is cause for concern, vendor shall work out a mutually agreeable solution with the outfitter and the state before bidding.
C. In-tank circulating engine coolant type fuel heater (Arctic Fox) with thermostat controlled by-pass.
D. Fuel maintenance system: Fuel-water separator/filter with thermostatic fuel temperature controlled electric heater, and filter restriction/change indicator, with water-in-fuel sensor. Components shall be factory installed ahead of fuel primer and other fuel filter(s).

12. CAB - INTERIOR

A. Interior trim/insulation package: Mid-level, to include a full headliner and back-of-cab trim panel(s). Color shall be medium brown or gray.
B. Floor covering: Heavy duty rubber/vinyl floor mat with sound deadening backing covering entire floor, dark color.
C. Ergonomic dash panel, center section angled toward driver for best access to switches and controls.
D. All pedals suspended from cowl. Floor mounted pedals are not acceptable.
E. Glass: All tinted.
F. Power window: Minimum right side, operable from both sides. If a full power window/power door lock package is provided, power door lock automatic engagement at set speed shall be disabled.
G. Air conditioning, heater and defroster. Highest BTU capacity available. Automatic automotive style outside air source/in-cab recirculation design. Safety shut-down protection system. All available HVAC system air intake filters - cab cowl inlet and evaporator module if available.
H. Sun visors: Left and right.
I. Grab handles: Cab entrance/exit assist, both sides. Arm rests on both doors.
J. Seats: Driver/passenger vinyl covered premium quality high-back air suspension with 3-point seat belts, tethered to allow free suspension movement. Each shall have an adjustable lumbar support, lower cushion angle, and minimum inboard armrest (National or approved equal).
K. Power steering: Integral gear. Ram system not acceptable.
L. Tilt/Telescope steering column. Smallest diameter steering wheel for the front axle specified.
M. Storage areas: Map pocket in door, overhead storage bin, or other storage area(s) suitable for manuals, small hand tools and other incidentals. Must not be mounted to or be part of back-of-cab interior liner.
N. Overhead console: Suitable for center installation of a Department 2-way radio. Console must have removable blank faceplate or open face, designed for installation of a radio.

13. CAB & HOOD - EXTERIOR

A. Air ride rear cab suspension for increased cab and cab component longevity.
B. Mirrors: West Coast Sr. heated, left and right, set for 102 inch trailer. Convex mirror head (minimum 48 in^2), heated, directly below each.
C. Fender mirrors: Low profile with 8-inch round convex head, installed to provide full-side-of-vehicle rear view, front-to-rear, without causing excessive blind spot.
D. Front grille: Stationary to clear front snow plow hitch.
E. OEM stone guard/bug screen behind grille.
F. Front hood tilt assist mechanism if available.
G. Exterior cab entrance grab handle(s), minimum left side. If a right side handle is available, it must be provided.
H. Paint: Omaha Orange (DuPont #31; color must be approved by Equipment Services). Frame and undercarriage shall be black. See Standard Specifications section D.
I. Wiper blades: Winter Anco model #29 or equal. Dealer installed if not available from factory.
J. Cowl tray lid, if available. Designed to prevent snow from directly entering HVAC intake.
K. Dealer shall not affix dealership identification stickers to the truck.

14. PERFORMANCE PARAMETERS

A. Gradeability %: High Gear, minimum 2.7%. Low Gear, minimum 62%. (Calculated @ Maximum GVWR @ Peak Engine Torque). To calculate gradeability the following formula shall be used: Gradeability = ((K x M x R x T) - 1) / GVW.
B. Rear Wheel Torque: High Gear, minimum 2,600 lb/ft. Low Gear, minimum 45,300 lb/ft. (Calculated @ Peak Engine Torque). To calculate rear wheel torque the following formula shall be used: Rear wheel torque = R x T.

Where: K = Constant, .104. M = Tire revolutions per mile, constant 497.
R = Ratio of reduction at axle shafts. Calculated by multiplying appropriate gear ratio (times torque converter ratio if not locked in automatic) times the numerical axle ratio.
T = Engine torque. GVW = Total weight vehicle, constant 37,000.

NOTE: Optional Equipment That May Be Required (pages 43 through 61) contains chassis information. Certain options are cause for chassis specification changes, effecting items such as front springs, fuel tank, steps, transmission, etc. It is advised that prospective chassis vendors review the entire specification for these items, but especially the Optional Equipment sections.

SUPPLEMENTAL SPECIFICATIONS
for
VENDOR PREPARATION OF SINGLE SNOW REMOVAL TRUCKS

1. TOWING HITCH AND BUMPER

A. Single axle truck longitudinal frame members are to be cut off 35 inches behind the vertical centerline of the rear axle. Cutoff edges of the truck frame shall be ground smooth.
B. A heavy duty and substantial pintle hitch and safety chain trailer towing assembly shall be install at the rear of the frame. Plate shall be minimum 1 inch thick solid steel, cut-out and fit onto the ends of the frame rails so it can be fully welded all around on both faces.
C. Plate shall be drilled to accommodate two pintle hitch heights, 31 inches and 24 inches to the installed center of the pintle hook. Hook shall be installed at the 31 inch height for delivery.
D. Pintle hitch shall be a Premier 2200A. Operation shall be with an air service chamber. Hitch shall be rated 100,000 lb. gross trailer rating, maximum tongue weight 20,000 lbs., latch capacity 60,000 lbs., designed for a 3 inch pintle eye.
E. Air pintle latch system shall be plumbed into the truck parking brake switch. Adequate slack shall be left in the line to accommodate both hitch heights.
F. Two swinging trailer type D-ring assemblies shall be welded to the plate, one on each side of the hitch, suitable for 20 ton GVWR trailer safety chain connectors.
G. Provisions for installation of a shielded 1 inch triple ID lamp set shall be provided directly below the hitch plate.
H. Provisions for air brake trailer towing gladhand couplers as well as a 7-pole trailer electrical connector, 6-pole trailer lighting connector, and 4-pole electric trailer brake connector shall be fabricated in the plate, allowing proper and convenient connections.
I. A removable rear ICC bumper shall be installed on the truck, set at 20 inches off the ground. Bumper shall be fabricated from 3-inch schedule 40 black pipe and be 80 inches in length. Sufficient 3/8 inch steel loops shall be installed to the bumper to allow the material spreader hydraulic hoses and liquid lines to be easily ran through and secured.
J. The bumper and mounting apparatus must be removable from the truck frame, necessary for tending an asphalt paver. However, since bumper also serves as the mounting support for the material spreader spinner(s) or zero-velocity applicator, bumper must be substantial enough to support these when banging down the road. Design shall not allow bumper to roll-under or flex from the weight. Appropriate measure shall be taken to prevent aging droop.
K. When the bumper is removed the truck frame must be free and clear of obstructions. The ends of the bumper shall be permanently capped.
L. All frame modification work shall be thoroughly cleaned, primed and painted black. All fabricated components shall be properly prepared and powder coated black.

2. FRONT SNOWPLOW HITCH

A. Truck shall be equipped with an Iowa DOT specification front snow plow hitch, suitable to allow the installation and use of a Department standard type snow plow.
B. OEM front bumper shall be modified, the center shall be removed where plow hitch mounts. Remaining side wings shall be structurally reinstalled to fill in the area below the tilt hood.

C. Plow hitch apparatus and bumper wings shall be powder coated black to match the truck frame.

D. The hitch and all subassemblies shall be of welded and bolted construction, able to be disassembled into manageable components to facilitate accident repair or replacement.

E. Front hitch installation shall not inhibit the hood tilt function. Support tubes or apparatus shall be arranged so that the hood will still go over-center and remain so unassisted. All normal engine maintenance points shall remain serviceable (air filter, lubrication addition and checks, washer fluid, radiator, etc.).

F. The mounting arrangement shall be built with sufficient flexibility for the plow to follow the curvature of the pavement at all times. It shall be of heavy plate and angle construction as follows:

1. Upper vertical lift horn angle iron mount 1/2" x 4" x 3".
2. Top horizontal angle iron 1/2" x 4" x 3".
3. Outside vertical angle irons 1/2" x 4" x 3".
4. Inside vertical flat irons between upper and lower lift ram mounts 1/2" x 3".
5. Bottom horizontal angle iron lower ram mount 1/2" x 4" x 4".
6. Lower push plates shall be 1/2 inch thick plate steel reinforcement plates relief cut for all chassis components, secured to the front hitch and the frame mounted reinforcement angles.
7. Lower push plates shall attach to truck frame above the front axle through 1/2" x 4" x 6" x minimum 18" long angle irons. This truck frame reinforcement shall extend from as far forward as practical (steering gear, crossmember) to as far back as practical (rear spring hangar, frame reinforcement).

G. The hitch attachment side plates that bolt onto the truck frame rail tips shall be 1/2 inch thick and shall extend back as far as practical onto the front end of the truck frame rail so as to reinforce the frame and support the plow hitch and, if necessary the hydraulic pump. Hitch side plates shall be bolted to the truck frame using minimum 5/8 inch bolts. Side plates shall attach and support the upper vertical horn lift angle irons, the top horizontal angle iron.

H. There shall be two mid-mounted vertical flat iron supports from the bottom of the upper horizontal angle iron down to the lower horizontal lower ram mount. The supports shall be evenly spaced between the outer vertical angle irons.

I. The snow plow lifting arm shall be designed to give a minimum vertical lift of 16 inches with the lift arm starting at 26 inches above the ground line in the retracted position.

J. Lift arm shall be manufactured from two 1/2" x 3" formed pieced of bar stock, welded to a 3/8 inch formed channel designed to receive a 3-inch tube. This assembly shall enable the arm to be adjustable in length. A single piece of 1/4 inch plate shall be fashioned to match the shape of the top of the assembly and welded on for additional strength.

K. Formed pieces of bar stock shall provide triangular reinforcement to the assembly. Rear of triangle where the pivot hinge will attach to the push frame shall be approximately 20 inches wide. A piece of 1-inch schedule 40 pipe shall be welded between the lift bars to provide a continuous bearing surface.

L. A 1-inch cold-rolled bar shall insert through this pipe and through the mounting ears on the push frame. Where the bar passes through the angle on each side shall be reinforced with a 1 inch bore set-screw shaft collar, welded all around to the angle. Each shall also be pinned on each end with a large cotter key after the collar. Pipe shall contain multiple grease fittings to allow lubrication along it’s length.

M. Adjustable center member of the lift arm assembly shall be approximately 27 inches long. Into it five 1-1/16 inch holes shall be bored through on the centerline, the first 2-1/2 inches from the end. The underside of the tubing below this first hole shall be relieved approximately 4-3/4 inches to allow a overcenter cable plow trip lift pulley assembly to be installed and hang freely if used by the location.

N. The second hole shall be 9 inches from the end, the third, fourth, and fifth shall follow the second on 4-inch centers.

O. The front of the adjustable center member shall have three banjo type chain eyes punched in 1/2 inch plate that will accept 1/2 inch chain welded to it. Plate shall be formed so the side banjo eyes are at an approximate 15^0 swept back angle from the flat front banjo eye. Assembly shall be of sufficient design to support the weight of any plow.

P. Snow plow lift will be accomplished with a 3-inch diameter by 10-inch stroke single acting ram. Ram piston rod shall be hard chrome plated. Rod seal shall be a standard polypak with O-ring style spring backer, moly coated (Parker standard molythane gray PolyPak or approved equal). The ram shall be installed in a normally inverted position with the barrel attached to the plow lift arm and the rod to the plow hitch so contamination debris will fall away from the wiper seal.

Q. The plow attachment ears are 1-inch thick and set on 33-1/2 inch centers. Each pocket shall be a 2-inch space with ½ inch thick ears or sides. Choice of two plow push point heights spaced on 4-inch centers shall be offered. Plow push height of the bottom hole on the hitch shall be 14 inches above the ground line.

R. Plow attachment pins shall be provided; pins shall be 6 inches long by 1-1/4 inches in diameter with 3/16 inch lynch pin retainer. The pins shall be tapered back 3/4 inch and down to a 3/4 inch OD point.

3. DUMP BODY MOUNTING & ACCESSORIES

A. Dump body shall be mounted on the truck approximately 37 inches back from the vertical centerline of the rear axle housing, measured from the centerline to the rear vertical face of the dump body (not tailgate).

B. Dump body subframe shall be bolted to each side of the truck's main frame rail at a minimum of three mounting points. Welding dump body mounts or rear hinges to a Department truck frame or cross members is strictly prohibited.

C. Each dump body sub-frame rear corner will need three hydraulic bulkhead fittings installed through it. These fittings are necessary for installation and routing of rear spreader and liquid system hydraulic lines. See Hydraulic System section, sub-section Hoses & Fittings.

D. Each rear dump body rub rail will need a hydraulic manifold plate installed. Each manifold plate will have three bulkhead fittings installed through it. Short easy to replace hoses shall be ran to this plate from the sub-frame mounted bulkhead fittings. Manifold plate shall be bolted to each body side so it is removable.

E. The dump body raise/lower control shall be a single axis mechanical joy stick. Dump body control system shall incorporate a body height indicator light and alarm.

F. The dump body is to be equipped with heavy plastic fixed half circle fenders to cover the rear drive tires, and full rear mud flaps.

1. Half circle fenders shall be ‘The Minimizer’ MIN2200B or pre-approved equal, installed at 6-8 inches off tires, attached to the truck frame.
2. Mud flap hanger installation shall prevent debris from being thrown up into the rear dump box corner post. Installations shall not block or inhibit the wash out of debris from the longitudinal body members.

3. Mud flaps shall be 1/2 inch thick fabric reinforced rubber, 24" x 30", hanging from a continuous press support (guard sandwiched between support bracket and continuous metal strip with the rubber flap to the outside or away from the tire). Flaps shall be free of lettering and have 8 inches of ground clearance when the truck is fully loaded.
4. The rear splash guard design shall keep them out of the rear tires when the body is raised. The rear flap and hanger shall be removable by sliding out a 25-inch long 3/8 inch stainless steel rod secured in place by a 1/8 inch hair spring pin.

G. Accommodations to allow the installation of a dump body vibrator shall be attached to the center front underside of the dump body. The vibrator mounting area shall be adequately reinforced to prevent dump body floor from flexing and ultimately cracking. The vibrator shall be mounted so it can be easily removed.

4. ILLUMINATION & ELECTRIC COMPONENT INSTRUCTIONS

A. Auxiliary snow plow headlamps shall be mounted to the hood no higher than 76 inches from ground level and a minimum of 65 inches apart measured from bulb centers. Auxiliary headlamps shall be Arrow model 779-99074 Right / 779-99075 Left with 5-wire lead and dedicated ground, built-in turn signals, fully powder coated. Auxiliary headlamp ground circuit shall be connected into the original truck headlight ground circuit. Headlight assembly shall have a 3/32 inch water drain hole. Wiring cable inside headlight assembly shall be tied in a knot to keep it from being accidently pulled out.

B. Vendor shall install a Department supplied 2-way radio antenna base on the truck cab roof. Installation requires the drilling of an approximate 3/4 inch hole in the roof, securing the base and running the coaxial cable to the header console radio compartment. Vendor must notify Equipment Services a minimum 30 days before bases are needed to insure delivery.

C. Dump body control system shall incorporate a body height indicator light and alarm. The limiter system shall allow easy adjustment of the body tilt angle from 15 degrees up to 45 degrees before the alarm is activated. Alarm shall have an intermittent on/off operation, clearly audible in the cab above all other noises. Warning lamp shall have a red lens and flash. This limiter system shall be turned on and off by the Winter/Summer switch in the OEM switch panel (see Chassis section entitled Electrical).

D. The pintle hook plate will require the installation of three trailer towing receptacles, in this order from left to right. First will be a green ABS 7-pole Cole-Hersee 12080-11. Second will be a 6-pole Haldex Midland No. 23602 or Cole-Hersee 1235, and the third a 4-pole Haldex Midland No. 23402 or Cole-Hersee 1232. No-name imported knock-off equivalents are NOT acceptable.

E. Both 6-pole and 4-pole shall be connect via the rear frame junction box (described below). The 6-pole socket will be wired for combination stop/turn trailer lighting. The 4-pole socket shall be wired for electric trailer brakes per specific Department requirements. The 7-pole shall be wired for anti-lock trailer brakes and separate stop and turn lamps. Wires installed in the connector inserts must first be tinned. After wire installation the wire side of the socket body shall be pumped full of RTV silicone and then assembled, effectively creating a sealed assembly. A minimum 6-inch piece of shrink tubing shall be installed over the cable and socket joint to further seal the connection. A Department wiring diagram is available upon request.

F. A 12-inch loop of extra slack shall be included in the three trailer wiring cables to allow for future repair.

G. A 4-gauge battery cable ground strap shall be installed from the dump body to the truck frame by means of a 5/16 inch cadmium plated bolt. Star washers shall be installed on both sides of the strap eye to insure a good ground.

H. Dump body illumination shall be installed as follows:

1. Clearance, stop/turn/tail and strobe lamps shall be Truck-Lite LED hermetically sealed installed with Truck-Lite flush shock absorbing rubber grommets. Rubber grommets must be closed back type for maximum lamp and plug protection.
2. The front corner posts shall have an amber 2-1/2 inch clearance lamp angularly mounted at 30 degrees near the bottom of the side rail. The lamps shall show to both the front and side of the body. Each of the body rear posts shall have a 2-1/2 inch diameter clearance lamp facing to the side, mounted approximately 6 - 10 inches down from the top of the post. The 2-1/2" round side marker and clearance lamps shall be a Truck-Lite LED model 10, #10050R red and #10050Y amber.
3. The rear face of each post shall have from the top down; a 2" x 6" stop/turn/ tail lamp and a 2" x 6" strobe lamp. All lamps must be fully visible over a raised spreader spill plate. Oval 2" x 6" red stop/turn/tail lamps for dump body shall be Truck-Lite LED model 60, #60050R.
4. Wiring harness shall be a Truck-Lite #50938 especially designed for LED lamp systems, consisting of a multiconductor color coded cable with a second layer of insulation.

I. Rear triple ID lamp bar shall be a Truck-Lite model 35 LED ID bar aluminum 1" width mounted below the hitch plate.

J. A 4-inch round tail lamp and 4-inch back-up lamp shall be installed in a fabricated stainless steel mounting box to the outside of the truck frame at approximately the same height as the original OEM lamps. They shall be set 4-inch ahead of the rear of the dump body floor or as far forward as practical, but not to interfere with the mud flaps. The mounting location shall protect the lamps as much as possible when the truck is being used with an asphalt laydown machine. Lamps must be 4" round red stop/turn/tail Truck-Lite LED model 44, #44030R, 4" round clear back-up lamps shall be Truck-Lite LED model 44, #44040C.

K. An electronic back up alarm with automatic volume adjustment from 82-107 dB(A) shall be installed between the truck frame rails at the rear of the truck, wired into the back up lamps (Ecco SA901, Target Tech 210504 or approved equal). Alarm must not be blocked or inhibited by licence plate or any other component.

L. Dump body shall be outfitted with a Department designed rear taillight air cleaning kit. Kit comprises of a pneumatic valve and timer, 1/4 inch plastic tubing, and brass fittings assembled as nozzles directed onto each oval dump body lamp.

M. Body shall be outfitted with DOT-C2 red/white parabolic retroreflective conspicuity tape (Reflexite or equal) as per Department guidelines. Layout pattern will be provided to successful vendor. Single axle trucks will require approximately 37-feet.

N. All wiring for the box lamps and the 6-pole and 4-pole trailer plugs shall join in a sealed Betts Dri-Seal Circuit Box #351044 at rear of the truck. Box shall be placed for easy maintenance above the pintle hook inside the truck frame rails, facing out to the rear. All ports, plugs, and wires installed in the box shall be additionally sealed with silicone sealant as an added measure of protection.

O. The vendor shall provide and install a shock absorbing rubber housed 4-inch sealed beam tractor style sander lamp mounted under the dump body, but not attached to the spreader, to illuminate the spinner area. Lamp shall be a Grote Par model 36 rubber tractor lamp No. 64931 or equal. If the truck is equipped with a dual discharge system, two lamps must be installed with automatic side-to-side on/off with the spreader side selector switch.

P. If the truck is ordered with a wing(s), the vendor shall provide and install a shock absorbing rubber housed 4-inch sealed beam tractor style sander lamp to illuminate the wing(s) path. Lamp shall be a Grote Par model 36 rubber tractor lamp No. 64931 or equal. If the truck is equipped with a dual wing system, two lamps must be installed with automatic side-to-side on/off with the wing side selector switch.

Q. Wing light wiring shall terminate outside truck cab near the rear of cab on the same side as the wing with a flange mount AMP #206430-1 connector with a cap. A label stating "Wing Light" shall be affixed near it. A mating connector half shall be provided for Department installation of a lamp, regardless if the truck is ordered with a wing or not. Mating connector half shall be fully assembled, complete with 12-inch wire pigtails.

R. All CPC couplings and receptacles (other than spreader cables) are to be AMP series I with type III crimp pins and sockets. The couplings and receptacles shall also have peripheral o-ring seals. All couplings and receptacles shall be nonmetallic with **gold** contacts and strain relief clamps. Unused plugs are to be capped.

S. All internal and external pins in the couplings and receptacles shall be coated with a non-conductive dielectric grease.

T. The complete chassis tilt hood assembly shall be made removable. All wiring, whether OEM or added, shall have Packard Weatherpack sealed connectors installed. Connectors shall be installed near the hood hinge point.

5. SPREADER CONSOLE, CABLES & INSTALLATION

A. A Cirus SpreadSmartRX spreader control console with anti-ice lane selector shall be mounted on or into the dash near the center of the cab. Console shall be ergonomically positioned for easy operation and viewing by the operator. Placement shall not inhibit other controls, such as the air brake valves, dash switches, and indicator lamps. Final position must be approved.

B. Modular spreader, pre-wet and anti-ice control wiring harness' shall be ran from the spreader control console inside the truck cab to the rear of the truck and terminate with ConxAll connections for pre-wetting and anti-icing, and M12 connectors for granular sensor connections (Turck or pre-approved equal). The system shall include minimum rated IP68 connections for all "outside the cab" connections, hydraulic valve coils, and sensors. Where the M12 connectors terminate at the granular pre-wetting and anti-ice sensor will have integral LED signal indicators for both power and signal.

C. Spreader and anti-ice connectors shall be installed on the right rear side of the dumpbody near the rear pillar. An angled plate shall be welded to the side of the body that will accept the two bulkhead mountable connectors, the cables shall be ran through the rear dump body pillar and weather sealed as best possible by a removable service plate.

D. The rearmost of the two connector/cables will be for spreader/prewet. It will be a 9-pin Mini-Fast C 1-1/8 inch. Forward connector shall be for anti-ice and shall be a 12-pin Mini-Fast C 1-1/8 inch and will include an integrated anti-ice sensor cable. Both cable shall employ 2mm pins for durability.

E. Watertight IP68 closure caps shall be provided for each end of each cable, attached by a lanyard.

6. DUMP BODY VIBRATOR

A. A Cougar/Rhino DC3200 or approved equal dump body vibrator shall be attached to the center front underside of the dump body. The vibrator mounting area shall be adequately reinforced to prevent dump body floor from flexing and ultimately cracking. The vibrator shall be mounted so it can be easily removed.
B. The dump body vibrator control switch shall be an integral part of the Wescon dump body control handle. Control grip shall be a pistol style with the vibrator button built into the end for easy thumb activation.
C. Vibrator circuitry shall include an integrated circuit 50% duty cycle timer (5-seconds on, 5-seconds off).
D. Vibrator circuit shall be protected by a 150 amp manual resetting waterproof circuit breaker (Wired Rite CB-150R or equal).
E. Circuit breaker shall be mounted on a nominal 8" x 8" x 6" fiberglass NEMA weather tight electrical junction box with hinged, sealed door and stainless latch, mounted on the same side of the battery box. Exterior must be marked “Main Breaker”. Box shall house both the resettable circuit breaker and the vibrator solenoid. All wiring entering and leaving shall be weather tight sealed.
F. Junction box shall be mounted to the side of the hydraulic reservoir or other approved easily accessible side-facing location. Mounts must be provided on both sides of the truck, to facilitate future reconfiguration of the truck, such as the installation of a wing or scraper if it doesn’t have one.

7. AMBER WARNING LIGHT & STROBE LIGHTS

A. Vendor shall provide and install an ECCO model 5280A LED dual rotating amber light bar to a gimbal bracket mount. Wiring to light bar shall be 12-gauge wired to the provided OEM always hot circuit, ran through the adjustable height pole. Adequate slack shall be allowed for all pole heights.
B. An adjustable amber light bar pole bracket shall be incorporated into the design of the cab protector shield. A receiver tube fabricated from a piece of 1-1/4 inch black pipe shall extend through and be welded into the center of the front edge of the shield.
C. Design shall allow a pole of 1-inch schedule 80 to be easily slid up-or-down in the receiver tube to allow height adjustment for the amber light bar. Light bar shall be height adjustable from the top of the shield (approximately 10-feet) up to a top height of approximately 13-feet. When delivered, amber light bar shall be set in its lowest position, around 10-feet up from ground level.
D. Adjustable pole shall be held at the desired vertical height by a pair of 3/8 inch square head set screws with knurled points. Set screws shall screw into a 3/8 inch nut welded to the outside of the receiver tube, aimed to the left side of the truck. A 3/8" x 4" long piece of steel rod shall be welded to each set screw to act as a “T” handle. Handles shall be easy to reach and operate, they shall not interfere with each other or contact any other part of the body.
E. The gimbal bracket shall pivot on sealed 1-3/8"OD x ½"ID shoulder ball bearings available as part #BRBSF0822 from Standard Bearing Company.

F. The light bar shall be attached to the gimbal bracket by four vibration dampeners, McMaster-Carr #9311K143 ribbed bushing in conjunction with #9311K145 ribbed ring. Mounting bolts used to attach lamp to the gimbal shall be carriage style. The carriage bolts shall be secured into position onto the bottom of the lamp by a flat washer and jam nut. After the jam nut another washer shall be installed, then the vibration dampener. Vibration dampeners shall be installed through the metal bracket. A final washer shall then be installed followed by a locknut. Locknuts shall be tightened enough secure the lamp but not enough to counteract the effect of the dampeners.

G. A rubber dampener (such as a bungee) shall be installed to limit the swing and absorb the shock of the gimbal bracket striking the swing stop.

H. The Department will make available to the successful vendor a prototype mounting and gimbal bracket assembly.

I. Trucks shall be outfitted with an Whelen IADOTSY1 amber LED2 lamp system, consisting of an oval Linear LED lamp installed in each of the rear corner posts and an in-cab flasher and control switch. The cable shall be a TPR jacketed tinned copper shielded cable for extended service life. Cable connectors at the rear lamps shall be sealed 2c Deutsch connectors.

J. System shall be a Whelen IADOTSY1 wired with a central flasher programmed to the Comet flash pattern with the light heads alternating. The flasher shall be encapsulated with hi/lo capabilities and snyc feature.

K. The rear LED lamp switch shall be a single HIGH/OFF/LOW design, provided in the chassis OEM switch panel.

8. <u>BRAKE COMPONENTS & EXHAUST MODIFICATIONS</u>

A. Air brake system must include a self-sealing nipple with dust cap for charging the truck air brake system. Nipple shall be easily accessible without starting truck or raising body, installed at the air dryer inlet or on the wet air tank.

B. Gladhand couplers shall be removed and placed in truck cab. Bulkhead couplers in tow plate shall be plugged with a flush brass plug liberally coated with anti-sieze.

C. Air lines cannot be spliced. If the air dryer or any of the air brake reservoirs/other components are relocated and the OEM line is too short, the entire length of line must be changed to an appropriate length.

D. A Draw-Tite Activator II electronic trailer brake controller shall be installed in the truck cab. Installation or position of control shall not interfere with the operator's comfort or the operation of the truck. Controller shall have proper circuit overload protection and pulse preventer.

E. If the truck exhaust system must be modified, any and all changes must be approved in writing by the OEM chassis manufacturer. All modified or added components must be of non-rusting stainless steel.

F. Any equipment installations shall not interfere and/or inhibit servicing of any exhaust system component, such as a DPF.

SPECIFICATIONS
for
HYDRAULIC SYSTEM DESIGN & COMPONENTS

GENERAL DESCRIPTION OF HYDRAULIC SYSTEM.

System will comprise of a variable displacement load-sense pump supplying flow to a multi-section tie bolt stack of load-sensing control valve sections, consisting of up to 7 sections. Cylinder functions will be manual cable controlled, orbital motor circuits shall be fully proportional electric. Combined system shall be rated for sustained 3,000 PSI operating pressure. All sections will be fully pressure and flow compensated.

All pump and valve ports shall have ORB (O-ring boss) straight threads. All hoses shall have JIC 37 degree female swivel fittings. All valves, solenoids and wires shall be protected from salt corrosion in an enclosure with removable access panels.

Contents of this section includes:

1. Suction strainer.
2. Return filter.
3. Hydraulic power source.
4. Valve circuits.
5. Cable controls.
6. Valve stack enclosure.
7. Reservoir.
8. Hoses & fittings.
9. Plow cushion valve.
10. Spreader control.
11. Hydraulic cylinders.

1. SUCTION STRAINER

   A. A Zinga TFS-2020-0-5 or approved equal full flow suction strainer shall be provided. Strainer shall have a 100 mesh element, be rated at or in excess of 49 GPM, be equipped with built-in 5 PSI bypass valve, and have 2-inch NPTF threads.
   B. Strainer shall be installed vertically into the bottom of the oil reservoir through a weld flange.
   C. A 2-inch full flow ball valve must be mounted directly to the strainer under the bottom of the reservoir. Ball valve operation lever shall be easily accessed. A heavy plastic wire tie or safety wire shall be installed to insure it physically stays in the open position unless intentionally closed.

2. RETURN FILTER

   A. Return filter shall be a full reverse flow inversion type with integral diffuser and double length element housing (MP Products MPH2503CDSAG4A10T or approved equal). Housing shall have 1-1/2 inch NPT port. Return assembly shall be rated for approximately twice the hydraulic pump maximum flow.
   B. Filter element shall be a replaceable inorganic microfiber cartridge type rated 10 micron absolute and minimum 75 Beta Ratio (MP Products MR2503A10A or approved equal). Element shall not be affected by or absorb water, which could freeze.

C. Housing design shall incorporate a built-in bypass valve with an approximate 20 PSI setting. A gauge type return filter condition indicator shall be installed on the inlet side of the filter housing. It shall be aimed so it can be easily viewed through the cab rear window.
D. There shall be a -16-NPT "T" fitting installed ahead of the return filter housing for the spreader return flow line.

3. HYDRAULIC POWER SOURCE

A. Chassis will be ordered with a factory front crankshaft PTO drive adapter plate suitable for directly driving the hydraulic pump at engine crankshaft speed via a balanced Spicer No. 1310 driveshaft. Driveshaft shall pass under the engine radiator and charge air effects. The driveline grease fittings shall be easily serviced.
B. Drive flange attachment bolts and the hydraulic pump shaft set screw shall be safety wired.
C. Hydraulic pump shall be a minimum 5.5 cubic inch (90cc) variable displacement load-sense designed for continuous operation, such as a Rexroth A10VO85DFR/52L series. The hydraulic pump shall be capable of producing a nominal 43.5 GPM flow at 1,800 engine RPM with a minimum 3,000 PSI operating pressure.
D. System normal operating pressure shall be set and sealed at 2,450 PSI (±50). Sense circuit standby pressure shall be set at 350 PSI.

4. VALVE CIRCUITS

A. Basic valve stack will consist of standard tie-bolted stacked working sections typically rated for a nominal 30 GPM capacity, Rexroth M4-12 or approved equal. Motor circuits will comprise of a 4-circuit cartridge motor manifold that is no larger physically than two regular Rexroth sections and suitable to be installed into the tie-bolt stack in lieu of two standard sections.
B. Inlet and outlet port sizes shall be -16 ORB. Work ports shall be ORB and sized as noted in the appropriate section below.
C. The valve assembly shall be configured with working sections as follows. The following list details the most common configurations, all combinations may not be represented. Valve shall be assembled in stack of logical function to provide best system operation.
D. All valve sections will have provisions for LS relief and workport reliefs. Where these functions are not required. Each section will have appropriate plugs installed.
E. All spools will be closed center cylinder type unless otherwise noted.
F. All spools targeted for flow optimization with shim adjustment for fine tuning.

Base Truck. This is the base valve expected on all trucks.

Section 1s.	Endcap		
Section 2s.	Hoist	34 GPM	4W/3P w/A workport relief @ 500 PSI
Section 3s.	Plow Lift	13.5 GPM	3W/3P w/A-port detent
Section 4s.	Plow Angle	13.5 GPM	4W/3P
Section 5s.	Mid-inlet with pressure, load sense, and tank ports.		
Section 6s.	LD Wing Lift	13.5 GPM	3W/3P
Section 7s.	LD Wing Slide	13.5 GPM	4W/3P

Section 8s. 4-circuit Motor Manifold: Described as follows. The physical size of the manifold shall be no larger than two Rexroth M4-12 valve sections and be rated to 3,500 PSI. The manifold shall be an integral part of the valve stack and shall not affect The Rexroth M4-12 circuitry performance. All cartridges and coils to be manufactured by Hydraforce. Manifold to contain four solenoid operated electrically-variable, two port, pressure compensated, spool type, normally closed when de-energized, proportional flow control cartridges with DIN coil. Each cartridge shall have a manual override. Each cartridge shall operate by a 12 volt DC coil with 6 inch leads and terminate with a Deutsch connector. The following flows for each circuit are described as follows:

Spreader Spinner	7 GPM	Spreader Auger	15 GPM
Anti-Ice Pump	15 GPM	Prewet Pump	7 GPM

Truck with optional Underbody Snowplow (UBP) only.

Replace Section 6s in base valve with the following described section:

Section 6.1.	Scraper Curl	13.5 GPM	4W/3P with A-port LS relief set @750, B-port LS relief set @ 500 PSI

Rename Section 7s in base valve with the following description:

Section 7.1.	Scraper Angle	13.5 GPM	4W/3P

Truck with optional MDFW or MDRRW only.

Replace Section 6s in base valve with the following described section:

Section 6.2.	Wing Toe	13.5 GPM	4W/3P w/A workport relief @ 500 PSI

Replace Section 6s in base valve with the following described section:

Section 7.2.	Wing Heel	13.5 GPM	4W/3P w/A workport relief @ 500 PSI

Truck with optional MDFW, MDRRW Wing and Underbody Snowplow (UBP).

Replace Section 6s in base valve with the following described section:

Section 6.2.	Wing Toe	13.5 GPM	4W/3P w/A workport relief @ 500 PSI

Replace Section 7s in base valve with the following described section:

Section 7.2.	Wing Heel	13.5 GPM	4W/3P w/A workport relief @ 500 PSI

Add two additional sections between 7.2 and 8 described as follows:

Section 7.2.3.	Scraper Curl	13.5 GPM	4W/3P with A-port LS relief set @750, B-port LS relief set @ 500 PSI
Section 7.2.4.	Scraper Angle	13.5 GPM	4W/3P

Truck with optional Zero Velocity Spinner.

Add an additional sections between 4s and 5s described as follows:

Section 4.1ZV.	ZV Spinner	13.5 GPM	3W/3P motor spool, 12 volt proportional w/Deutsch connector

Truck with optional Down Pressure Front Plow Hitch.

Change section 3s in the base valve to the following description:

Section 3.1.	Plow Lift	13.5 GPM	4W/4P A-port LS relief set @ 1000 PSI, B-port LS relief set @ 1250 PSI w/ 4th position float.

G. Load sense relief valves shall be adjustable on the final valve assembly. Work port relief valves shall be fixed setting non-adjustable unless otherwise noted.

H. All spool valves shall have feathering grooves.

I. Remote operation of the cylinder sections will be by means of mechanical cable controls. Spreader/pump sections shall be operated by means of proportional electric solenoids and pilot piston operation to energize the spools, controlled by a closed-loop spreader control. All electric sections shall have a manual screw override to allow the section to be set if the solenoid fails.

J. Other hydraulic functions operating shall have little or no affect on spreader operation. Spreader spinner return line shall have a 60 PSI residual check-valve installed to prevent spinner free-wheel.

K. The valve stack work section ports shall be adapted to hose sizes as follows, or if not listed to a size appropriate for the flow:

1. Plow and Wing sections: 3/8 inch.
2. Spreader spinner section: 1/2 inch.
3. Spreader auger section: 3/4 inch.
4. Spreader prewet section: 1/2 inch.
5. Spreader anti-ice section: 3/4 inch.
6. Dump body section: 3/4 inch.

5. CABLE CONTROLS

A. Cables shall be premium quality Morse brand (no substitutions) series 40 Redline with anti-contamination seals and direct bonnet connectors.

B. All controllers except the dump body unit shall be Morse 206301 for single axis and 308721 for dual axis applications. Dump body controller shall be a Wescon with pistol grip, integral vibrator button and mechanical safety lock. Cables shall be routed as per Morse specifications in regards to bend radius and installation.

C. Lever 2 below (front snowplow) Morse control shall be equipped with a 2-button control knob assembly in lieu of the standard round knob. Buttons will control the Blast/Pass feature of the spreader controller.

D. Vibrator circuitry shall include an integrated circuit 50% duty cycle timer (5-seconds on, 5-seconds off).

E. Controllers shall be configured as follows to correspond with the valve requirements:

Base Truck. This is the base lever bank expected on all trucks.

Lever 1.	Dump Body up/down:	Single axis with pistol grip, vibrator control electric push button switch on end of grip, and mechanical safety lock
Lever 2.	Snow Plow Up/Dn Snow Plow Reverse R/L	Dual Axis with Detent Down
Lever 3.	LD Wing Up/Dn LD Wing Slide In/Out	Dual Axis

Truck with optional Underbody Snowplow (UBP) only.

Replace Lever 3 in base bank as follows:

Lever 3.1.	UB Plow Up/Dn UB Plow Rotate R/L	Dual Axis with Detent Down

Truck with optional MDFW or MDRRW Wing only.

Rename Lever 3 in base bank as follows:

Lever 3.2.	Wing Toe Up/Dn Wing Heel Up/Dn	Dual Axis

Truck with optional MDFW, MDRRW Wing and Underbody Snowplow (UBP).

Rename Lever 3 in base bank as follows:

Lever 3.3.	Wing Toe Up/Dn Wing Heel Up/Dn	} Dual Axis

Add Lever 4 to base bank.

Lever 4.	UB Plow Up/Dn UB Plow Rotate R/L	} Dual Axis with Detent Down

6. VALVE STACK MOUNTING

A. Valve stack shall be mounted as practically as possible directly below the reservoir for protection. It's mounting shall be part of the reservoir mounting, using the reservoir circular rubber isolation mount system to isolate it from the chassis frame flex.
B. Stack shall be mounted horizontally, with work ports facing rearward and cable control bonnets down.
C. Hoses attached to the working ports must have long/short 90-degree sweep ends, necessary for wrench clearance between themselves.

7. RESERVOIR

A. The oil reservoir shall be a rectangular sectional design providing a 35 usable gallon oil capacity.
B. Reservoir is to be mounted directly behind the truck cab on a rubber isolated stand, the bottom being approximately 20 inches above the top of the truck frame rail. Circular rubber isolation mounts shall be Lord Mechanical Products J-8006-10.
. C. The reservoir shall be fabricated approximately as follows. Overall size approximately 12 inches deep by 34 inches wide by 23 inches high, fabricated from low-carbon Austenitic 201, 304L, or Nitronic 30 stainless steel.
D. A vertical baffle shall be installed to promote peripheral circulation of oil.
E. A return oil filter housing shall be installed into the right top of the reservoir, approximately 6 inches in from the edge. See Return Filter section above. Filter housing outlet must be on the opposite side of the vertical baffle from the suction filter. All return oil must pass through the return filter.
F. Oil outlet to pump must pass through a suction strainer. A 2-inch NPT weld flange shall be installed through the left bottom of the tank. The suction strainer shall be installed from the outside, screwed into the weld flange. See Suction Strainer section above.
G. An easy to see and read unbreakable oil level sight gauge with 0-250^{0}F thermometer (Zinga SG-05M-T) shall be installed on the left side of the reservoir with the gauge full mark positioned at 6 inches down from the top of the reservoir.
H. An inspection cover/access plate with an approximate net opening of 7" x 7" shall be provided in the top of the reservoir centered approximately 6 inches in from the left edge, approximately above the suction strainer. A premium quality ventilating cap/fill port with 10 micron foam filter element strainer (Zinga FB-10-40-00-0) shall be installed on the inspection cover. Filler cap shall be cast aluminum. Installation shall prevent hydraulic oil from overflowing during an operation and when the truck is working on road side slopes.
I. Top center of reservoir shall have a 1-1/4 inch weld flange installed suitable for the installation of a Force America S2-TSM15-L217-AC-DN-SS high temperature/low oil level sensor assembly.

J. Reservoir bottom shall be equipped with a 3/4 inch NPT weld flange to accommodate a drain mechanism. A hydraulic 3/4 inch T-fitting shall be screwed to the weld flange with a magnetic 3/4 inch NPT plug (Zinga MP-75) on the opposite straight-through port. To the 90 degree T-port a 3/4 inch ball valve shall be attached. A 3/4 inch hose barb fitting shall be screwed into the valve and directed out to the left side, passing through a hole in the reservoir mount. Purpose is to allow easy draining of the reservoir by simply sliding a hose on the barb, opening the valve and directing the oil into a receptacle. Ball valve operation lever shall have a heavy plastic wire tie or safety wire to insure it stays in the off position unless intentionally moved.

K. Reservoir interior and exterior shall be thoroughly cleaned to remove weld slag, splatter, dirt, and any other foreign materials.

L. Vendor shall fill the hydraulic system with premium quality Dextron III automatic transmission fluid which will serve as hydraulic oil.

8. HOSES & FITTINGS

A. All flexible hydraulic hoses (suction, pressure and return lines) shall have JIC 37 degree female crimp-on permanent fittings.

B. All hoses and fittings, with the exception of the suction line, shall be non-skive high bend radius with a minimum operating pressure of 3,000 PSI, regardless of size (Gates XTF abrasion resistant or pre-approved equal).

C. Splicing of hoses is unacceptable. All hoses more than 3-feet in length shall be attached via swivel adapters. Pipe fittings, galvanized or zinc plated fittings, or the use of Teflon tape is/are unacceptable anywhere in the hydraulic system.

D. Pressure and suction lines shall attach to the hydraulic pump with a swivel fitting. Lines shall be easily unconnected for servicing the pump, fittings shall have adequate tool clearance.

E. Fittings used on the pump and other constant flow components such as hydraulic motors shall be hydraulic sweeps or straight connections. Hard 90-degree fittings on constant flow components or in constant flow hydraulic lines are not acceptable.

F. All hydraulic lines shall be firmly secured. Lines shall be attached to the truck and/or components by metal bands, insulated by rubber padding to prevent hose chafing and/or cutting. Hoses shall be routed away from components that could cause them to be damaged. Installation of hoses shall not interfere with or inhibit the normal servicing of the truck.

G. Hoses shall be as follows and/or shall be sized not to exceed the manufacturers recommended flow velocities. Specified hose brand data is available in the Gates Engineering and Technical Data Nomographic Chart.

1. Suction: Reservoir to pump, 2-inch ID. SAE 100R4.
2. Pressure: Pump to valve assembly, 1-1/4 inch ID.
3. Sense line: Pump to valve, 3/8 inch ID.
4. Return: Valve assembly to reservoir return filter, 1-inch ID.
5. Plow lift and reverse: 3/8 inch ID. Plow lines routed to left-hand side of grill assembly. Plow lift hose attached to the lift ram with adequate slack.
6. Spreader auger/anti-ice: Valve assembly to manifold plate, 3/4 inch ID.
7. Spreader spinner/injection: Valve assembly to manifold plate, 1/2 inch ID.
8. Manifold plate to motors: 1/2 inch ID.
9. Return from manifold plate to dual return T-fitting: 3/4 inch ID.
10. Main return from T-fitting to tank: 1 inch ID.
11. Dump body hoist lines: 1/2 inch ID.

H. Spreader and liquid pump hydraulic lines shall be ran to the rear of the truck and split up as follows:

1. Lines shall be split, three per dump body side, installed in this order from front to back of truck, on the manifold plates. Right side shall be 3/4 inch return, 3/4 inch auger, and 1/2 inch prewet. Left side shall be 3/4 inch return, 3/4 inch anti-ice pump, and 1/2 inch spinner.
2. Pressure lines shall extend from the valve bank along the truck frame and terminate at a bulkhead fittings on the inside of the dump body sub-frame rear corners. On the external side of the bulkhead fittings, a short easy to replace hose shall be ran to each dump body side manifold plate.
3. Lines shall be matched and identified by installing different color high quality wire ties on each side of the coupler set. Operator shall be required to simply match the colors and connect the implement.
4. Main 1 inch return line shall be ran to the rear of the truck and be split into two 3/4 inch lines, one extending to each inside sub-frame bulkhead fitting. On the external side of the sub-frame bulkhead fitting, a short easy to replace hose shall be ran to each dump body side manifold plate.
5. Parker SM series quick couplers shall be mounted to each plate with a 90 degree elbow, so the couplers are directed down and to the rear, so water will run out.
6. Couplers shall be as follows:

Left side.	Return:	Male 3/4" Parker SM-752-12FP
	Anti-ice Pump:	Male 1/2" Parker SM-502-8FP
	Spinner:	Female 1/2" Parker SM-501-8FP
Right side.	Return:	Male 3/4" Parker SM-752-12FP
	Auger:	Male 1/2" Parker SM-502-8FP
	Prewet:	Female 1/2" Parker SM-501-8FP

7. 1/2 inch SM-500-8FP coupler set(s) shall be installed in the spinner lines to allow the spinner(s) to be easily removed.

9. PLOW CUSHION VALVES

A. Cushion valves (Gresen DXV or equal) shall be installed to protect all front and under body snow plows and/or scrapers. Valves shall be spring and ball style with (-10) ORB ports.

B. Front snow plow cushion valve shall be set at 1,800 PSI. Valve shall be bolted to the plow hitch frame on the left of the plow lift ram. One outlet shall have a 30-inch long by 3/8 inch hose with a male Parker brand SM502-8FP series coupler attached to the end. A corresponding female coupler half SM501-8FP shall be installed directly into the other cushion valve outlet port. The hose with male coupler half shall be looped back and attached to the female coupler.

C. If the truck has an optional underbody snow plow or scraper, a 1,800 PSI cushion valve shall be installed on the plow between the dual rotational cylinders.

10. SPREADER CONTROL

A. Vendors must provide a Cirus Controls SpreadSmartRX fully electronic spreader control or pre-approved equal .To be pre approved vendors must demonstrate, that their controller has the capability to simultaneously control the application and/or distribution of four products/functions (granular, prewet or injection pump, anti-icer, and spread width or zero velocity). It must be capable of controlling the spreader hydraulic valves without separate interfaces or adapters. It shall be of current design, meaning that it shall have a manufactured date as the same year being bid.

B. All necessary software, programs, cables (including manufactured off of the shelf extension cables for slip-in or trailerized liquid application devices) shall be provided so as to provide a complete and fully functioning spreader control system. Future upgrades and improvements shall be available free of cost through an Internet download process. Spreader control shall be no larger than 55 square inches and dash mounted in an unobstructive spot.

C. Installation shall position the control so it is easy for the operator to see and reach. Position shall not inhibit access to other controls, such as air brake switches. Spreader controller shall have a single 6” x 3.25” vacuum formed Display. Spreader control display shall have a luminance filter and shall not wash out with daylight.

D. Display shall be a 240 by 64 pixel liquid crystal type capable of simultaneous display of Granular, Pre-Wet, and Anti-Ice application rates. Anti-ice status shows actual application rate of material being spread as reported by sensors. Display shall also show actual ground speed, all active alarms, and other sensors (pressure, temp, GPS, gate height, etc).

E. Control must be capable of controlling the application rates of granular, pre-wetting agents, and anti-icing agents, all simultaneously or independently, regardless of vehicle speed. Control must be GPS compatible and capable of bidirectional data communication. It must be possible to re-program the controller by simply hooking up a laptop computer and downloading or re-installing a program.

F. Controller will be capable of granular spreading in pounds-per-mile or pounds-per-lane-mile and liquid application in gallons-per-ton and gallons-per-mile, easily operator selectable. Controller shall include functionality that calculates needed materials based on route distance and spreading rates for all granular and liquid materials.

G. Controller shall be capable of accepting and displaying temperature inputs from a road temperature sensor such as a Sprague RWSS. The system controller shall be capable of ground speed oriented, closed (zero velocity) or open loop spinner control.

H. Anti-ice feature shall include 3-lane selective lane switches. It shall have 4-switches, the first to activate anti-ice feature, the remaining three shall be lane selection switches, left, center, and right.

I. System shall provide a means for operator to reset and/or indicate current volume of liquid in anti-ice and pre-wet tank(s) as part of power-up routine. System shall display current liquid volume in tank(s) while pre-wet and/or anti-ice system is active. The system controller shall be capable of managing of up to three anti-ice boom operations with individual boom selection.

J. The controller shall have ability to measure distance (in feet) and be re-settable (use to include location from intersection for sign posts).

K. Spreader controller must provide on-screen help documentation of all main operating functions. On-screen help must be automatically updated when any new system software is updated. On-screen help shall be sufficient to enable users to operate the system by following the on screen instructions, without referring to the printed operations manual. Controller shall have built in diagnostics (using the display for checking pulse from all sensors, etc).

L. The controller shall offer multiple layers of access control to set up files:

1. "Factory standard" password protected access to operating functions and setup files.
2. Supervisor re-set capability for each password.
3. "Laptop computer only" access control for higher security.

M. System shall alarm either audibly or visually for the following conditions: off rate, sensor failure, low liquid remaining, low liquid flow shutoff.

N. Material rates, granular or liquids shall be by toggle actuation (+/-). Toggle paddle actuation shall cause the display to respond accordingly: The first toggle touch shall cause the display to show the current rate set point. The second toggle touch and all subsequent toggle actuations shall increase or decrease the current rate set point.

O. System shall provide up to 10 supervisor settable application rates in each of up to 10 granular, Anti-Ice, & Pre-Wet materials. Controller must provide the ability to name each material with up to five characters. Rate increments shall be individually settable for each material.

P. The controller shall have a Blast feature. The blast feature will be activated by the use of a 3 position toggle paddle switch. Blast calibration shall be settable during setup/calibration. Blast shall be capable of operating in the following three modes: Latched On, Timed On or Momentary On. Blast is active only while operator is activating Blast switch. Blast shall be disabled in absence of ground speed signal. Blast shall also be available as a remote switch.

Q. The controller shall have a Pass Feature. The Pass feature shall be activated via the same 3-position paddle switch. The controller will default to the pass mode upon start up of the system. Pass shall be capable of operating in the following mode only: Latched On – Press "pass" switch and all spreading stops until operator presses "pass" switch again. Spreader will then return to current application rate. Pass shall also be available as a remote switch.

R. Front snowplow Morse control lever shall be equipped with a 2-button control knob assembly in lieu of the standard round knob. Buttons will operate Blast/Pass features above.

S. Wiring: The system controller shall have one lead from each hydraulic valve coil wired to a common ground point. The system must supply pulsed +12 volt power to the other lead for each individual valve coil. For safety reasons, grounding or cutting any wire at any point between any valve coil and the controller must not cause any valve to actuate.

T. The system shall include minimum rated IP68 connections for all "outside the cab" connections, hydraulic valve coils, and sensors. M12 connections shall be provided for pre-wetting, anti-icing and granular sensor connections. M12 connectors where they terminate at the granular pre-wetting and anti-ice sensor will provide LED's for both power and signal.

11. HYDRAULIC CYLINDERS

All hydraulic cylinders and rams used for the snow plow equipment components and operators shall be premium quality designed for a minimum of 3,000 PSI system operating pressure. Cylinders and rams shall be designed for long life in a high salt environment. Components shall be rated with an adequate safety failure margin suitable for the shock loads imposed by a snow plowing operation. Snow plow lift rams shall be as called out in the plow hitch specifications. All cylinders shall be as per the following:

A. Steel tubing ASTM A513 type 5.

1. (DOM) welded & drawn over mandrel, stress relief annealed.
2. Grade (UNS G10260) 1026; Class COM-SRA.
3. Inside shall be honed to micro finish of 10-20 RMS.

B. Solid piston rod and piston rod tubing, ASTM.

1. Solid piston rod to be grade C1045/1050 ASTM A311 cold drawn shafting, stress relieved with minimum yield strength 100,000 PSI and 8% elongation.
2. Piston rod tubing required for use in trunnion type cylinders must be grade 1026, ASTM 513 stress relieved and annealed with minimum yield strength 75,000 PSI. 14% minimum elongation in 2 inches. Honed nominal to 0.003 inch. Minimum wall thickness 0.250 inch. Bore finish to be between 4-16 RA.
3. Salt Nitrated shaft hardening/corrosion protection is acceptable and must be provided if available in lieu of chrome plating if it is available.
4. If shaft is chrome plated, chrome must be a minimum thickness of 0.001 inch per side at a micro finish of 6-12 RMS.
5. Chrome shaft must be certified as rust resistant, ASTM B117 36 hour salt spray test.
6. Shaft shall be turned down to no less than a 1-inch diameter for piston attachment. The piston shall attach to the rod with a minimum 1-inch self-locking nut.

C. Rod end-cap and gland.

1. Cylinder barrel shall be threaded to accept end-cap. End-cap shall be threaded and screw onto/into the barrel, holding the gland in place. Snap-ring retention of the end-cap is not acceptable.
2. Cylinder barrel shall be smooth throughout, end-cap end shall be internally chamfered to allow easy non-damaging insertion of the piston seals and gland.
3. End-cap shall have a positive lock to prevent vibration loosening.

D. Seals. Cylinder design and seals must provide a tight and leak free component, internally and externally. Cylinders should not allow implement creep-down or unintentional drop.

1. Piston seals: Standard Polypak with O-ring style spring backer, moly coated (Parker standard molythane gray Polypak) or two ring capped t-seal design (Verco Capped T-Seal).
2. Piston rod seal: Standard Polypak with O-ring style spring backer, moly coated (Parker standard molythane gray Polypak) or symmetrical loaded U-Cup w/B-lip (Verco).

3. Gland seals: O-ring with backer. O-ring to be minimum 70 durometer hardness Nitrile compound.
4. Rod wiper: Snap-in one-piece (Parker type D or approved equal) installed in the rod end cap.

SPECIFICATIONS
FOR
4 CUBIC YARD DUMP BODY WITH HYDRAULIC HOIST

The following specifications and dimensions shall apply to the purchase of heavy duty nominal 4 cubic yard capacity truck mounted dump body and subframe assemblies. The complete dump body and subframe shall be designed for and of adequate construction to withstand all stresses incurred from use with a tailgate-mounted sander with separate tailgate mounted liquid system or integral winter tailgate spreader/liquid tank assembly.

1. GENERAL

The body to be provided shall be a Western style (smooth flat bottom no cross stringers) body with the following dimensions:

A. Nominal capacity, 4 cubic yards.
B. 10-feet maximum inside length.
C. 96 inches maximum outside width.
D. 84 inches minimum inside width.
E. 21 inches minimum side height.
F. 30 inch minimum front post height.
G. 30 inch minimum rear post\tailgate heights.
H. 6 inches hinge pin setting.
I. 2-inch rolled section to match floor and side.

2. BODY

A. Body sides, front bulkhead and tailgate shall be constructed of 7-gauge A570 grade 50 steel with minimum 50,000 PSI yield strength and 65,000 PSI tensile strength ratings.
B. Body rear corner posts shall be fabricated from minimum 7-gauge low carbon Austenitic 201, 304L, or Nitronic 30 stainless steel. Rear posts shall be internally reinforced to withstand the additional weight of an optional up to 3,000 lb. winter tailgate assembly.
C. Front of body shall be fabricated from one piece of steel, without horizontal seam, and incorporate a cab protection shield (without window slots or any opening). Front shall have adequate horizontal ribs bent into it to prevent load swelling. Shield shall be sized to basically match the truck cab, extending approximately 3-inches above the top of the truck cab roof. It shall extend forward 16-inches from the front inside face of the dump body, formed with 2-inch high front and side edge lips, bent in as a part of the main structure, the side lips can be welded on.
D. Body floor shall be constructed of 3/16 inch plate (not gauge steel) with a nominal 100,000 PSI yield strength, 114,000 PSI tensile strength, and certified 235 hardness abrasion resistant (AR) rating.
E. No splice joint permitted in the center of the floor. If welds in the floor are required, they shall be continuously butt welded on both sides of joint; automatic seam welded with 100% penetration would also be acceptable.
F. All body sides, cab protector, floor and tailgate welds shall be continuous (skip welds unacceptable). All vertical and horizontal channels on the body shall be completely sealed by 100% continuous weld. If both sides are visible, both sides shall be welded.

G. Front corner posts shall have open bottoms to allow complete drainage. Rear post shall be protectively capped at the bottom to protect it from water and mud spray from the rear tires, and also to prevent it from filling with snow and ice in the winter. They shall still have drain holes.

H. Side rails shall be horizontal self cleaning. Top rail on the front bulkhead and both side rails and rear tailgate of the body shall have either a 2-inch rolled radius or an approximate 45-degree taper. The taper shall be to outside of body with the exception of the front bulkhead it shall taper to the inside of the body.

I. A 2-inch ID schedule 40 black pipe shall be welded between the front and rear corner posts flush with the top of the posts. The pipe shall have three evenly spaced vertical supports welded between the bottom of the pipe and the top of the body side.

J. A 3/4 inch diameter rerod shall be attached along the entire length of both sides of the body along the lower quarter of the sides in such a way as to function as a step the length of the body. The rod shall be welded to triangular gussets that are continuously welded to the rerod and the rub rail.

K. A spreader cable connector bulkhead plate shall be installed on the right rear of the body side in front of the rear post to accommodate both a granulat/prewet cable and anti-ice cable bulkhead connector. Plate shall be angled slightly downward.

L. The body front bulkhead and removable double acting tailgate shall be adequately reinforced to withstand heavy dumping, loading, and operating in a raised mode to charge the tailgate spreader while the truck is moving.

M. Tailgate to have two evenly spaced balanced lift loops to allow easy removal. Loop(s) shall not protrude beyond the tailgate rear face or otherwise interfere with the installation of a tailgate mounted pre-wet sprayer system.

N. Tailgate shall have two sets of bushings welded through it suitable for the 3/8 inch bolts that hold the sander side shields in place. Bushings shall be welded 100% around their OD.

O. Lower tailgate pins shall position tailgate level with floor when opened.

P. Upper tailgate pins shall pass completely through the upper corner post and be secured with a lynch pin. Pins shall be greaseable. Dead hole pin is not acceptable.

Q. Upper corner post tailgate hinge receiver pin holes shall each have a bearing surface width equal to the tailgate member width. If the tailgate top hinge material is 1" thick, each post member shall be 1" thick or bushed to a 1" thickness.

R. Front lower corner post shall be punched with a 2-25/32 inch diameter circular punching for the installation of a 2-1/2 inch diameter amber clearance lamps set at 30-degree angle from the side of the box, visible from the front and side.

S. Rear face of the rear corner posts shall each be punched, from the top down, as follows: a 2" x 6" oval, tail light puffer fitting hole between, and a 2" x 6" oval. These two 2" x 6" oval punchings will be for the installation of a stop/turn/tail lamp in the upper and strobe lamp in the lower. Punched holes shall be placed as high as possible in the rear post face, but without causing the installed lamp rubber grommets to overlap.

T. Side of the rear post shall be 2-25/32 inch circular punched for the installation of a 2-1/2 inch diameter clearance lamp approximately 6-10 inches down from the top.

U. Lamp punchings shall be positioned high enough up in the rear face of the rear post so the stop/turn/tail lamp and strobe lamp is fully visible when the spreader auger cover is in a raised vertical position spreading mode.

V. Front center of dump body between longitudinals shall be adequately reinforced to withstand a dump body vibrator. Reinforcement(s) must be factory installed by the body builder while the unit is being manufactured. Reinforcements must fit closely to the body understructure, weld must be continuous.

W. Tailgate chains shall not obstruct dump body lights mounted in rear corner posts. Chains shall be grade 43 covered with a nylon or plastic netting cover.
X. Tailgate trip mechanism, if enclosed at any point, shall be greaseable. Rear cross shaft shall have body side external grease fittings so the shaft can be easily greased. An operator shall be easily capable of releasing the tailgate with the box loaded and in the raised position.
Y. Trip release lever shall have adequate finger/hand clearance all around in the locked position. Over-center return to lock shall not smash the operator's hand.

3. TAILGATE STIFF ARMS

A set of removable stiff arms shall be provided which will install between the dump body tailgate lower lock pins and release sockets, designed to hold the tailgate in a fixed open position during a spreader operation. Stiff arms will allow the maximum design amount of material to enter the spreader hopper. Stiff arms shall be designed to prevent material weight damage occurring to the spreader and/or spreader cover when the dump body is in the raised position charging the spreader hopper. They shall include a mechanism to hold them in a fixed position on the tailgate to allow one person to install and remove them. Note: If a winter tailgate option is specified, these stiff arms are not required.

4. BODY MONOCOQUE UNDERSTRUCTURE

A. Body understructure longitudinal support members shall be fabricated trapezoidal shaped long sills running the entire length of the body. Trapezoid shall create a 10 inch tall member, 10 inches wide on the body floor and 2 inches wide where they meet and rest on the hoist subframe.
B. Longitudinal members shall be constructed of formed minimum 1/4 inch thickness 70,000 PSI tensile high strength steel. All seams creating the member and attaching it to the body floor must be continuously welded to prevent salt intrusion. Metal comprising the 2-inch bottom face of the trapezoid shall overlap, effectively creating a 1/2 inch thickness where it meets the subframe and the hinges attach.

5. HOIST

A. Standard mount, minimum NTEA Class 50 performance rating, providing a minimum 20-ton rating, capable of a dump angle of 45 to 50 degrees.
B. Assembly shall be a single cylinder design employing 6-inch ID bore, double acting cylinder designed for a 3,000 PSI working pressure system, or approved equal.
C. Hoist frame sidemembers shall be one piece, formed nominal 5 inch high by 3 inch wide channels fabricated of minimum 1/4 inch thick 70,000 PSI tensile high strength steel. Pivot hinges and/or rollers shall be bolted to allow servicing and repair. All hoist seams and joints shall be continuously welded to prevent salt intrusion.
D. Hydraulic cylinder shall have a hard chrome plated piston rod with 1.4 mils chrome thickness. Shafting shall be certified to meet ASTM B117 36 hour salt spray test requirements.
E. Cylinder shall have a built-in port relief that operates when the cylinder reaches full stroke.
F. The lifting forces of the cylinders shall not be applied directly to the body. Hoist shall function through a lifting arm linkage.
G. Body must be equipped with OSHA approved safety strut(s).

H. All hinge points, pivots, linkages and/or rollers shall be fully greaseable via a standard grease fitting. Composite and/or nylon type bushings are not acceptable. Wide pivot joints must include multiple grease fittings placed radially along the joint to insure complete lubrication around the entire circumference and length of the joint.

6. SPECIAL PAINT & RUST-PROOFING REQUIREMENTS

A. Entire dump body (inside, outside, underneath, tailgate) and entire hoist and sub-frame (except cylinder(s)) shall be completely blasted to remove all mill scale, contamination, shipping primer, paint, and any other foreign material that may effect final finish adhesion.

B. The preferred method of body coating will be complete powder coating. If that is not possible, the following must be employed:

1. After blasting, inside of body up to within 9" - 12" of the side height shall be coated with black coal tar finish. Purpose of coal tar is maximum durability and corrosion resistance.
2. Body exterior shall be painted orange to match the truck cab per Standard Specification requirements.

C. Sub-frame and hoist shall be mounted on truck frame and all attachment tabs, bolt holes and other brackets and parts welded on and pre-assembled as practical. Then entire sub-frame and hoist assembly (less cylinder) shall be disassembled, blasted to white finish, powder coated black, and re-assembled.

D. After body installation, truck frame, bolt heads, pins, cylinder(s) and any/all other surfaces that could rust shall be ‘black-out’ painted for corrosion protection. Truck frame shall be over-coated to hit all areas, components, bolts, etc. recently installed or missed by manufacturing plant.

E. Entire underside of body, inside of corner post and full length of all longitudinal members of the body and it’s understructure shall also be thoroughly coated with rust-proofing compound. No bare metal shall be left exposed in the posts, rub rails or anywhere else in/on/under the body.

F. Rust-proofing compound shall cure to a dry-to-touch state, not remain sticky.

G. Body will be thoroughly inspected for proper finish applications and rust proofing. Any bare metal found will be immediate grounds for rejection.

SPECIFICATIONS
for
STAINLESS STEEL TAILGATE SPREADER

1. GENERAL

A. The spreader will be used to apply granular ice control materials to a roadway surface.
B. Spreader shall be an under-tailgate mounting with heavy duty hinge brackets and pins for attachment and removal.
C. Spreader shall be hydraulic power driven auger design with spinner.
D. Overall width shall not exceed 96 inches.
E. The spreader shall be designed to have a variable delivery rate, ranging from a minimum of 60 pounds of salt to a maximum of 800 pounds of salt per lane mile at a delivery speed of 25 MPH. Salt for calibration shall be Hutchinson Salt Co. Kansas Medium Rock Salt with a bulk density of 71 lbs. per cubic foot.
F. All components of the spreader shall be low carbon Austenitic 201, 304L, or Nitronic 30 stainless steel unless otherwise noted.

2. HOPPER

A. The hopper shall be a trough design with 6-inch diameter cross auger discharging onto a rotating spinner.
B. Hopper shall be a minimum 7-gauge thickness.
C. All weldments shall be continuous on mating parts. All splatter and slag shall be removed, sharp corners and punching shall be ground smooth.
D. A removable anti-flow cover plate shall be furnished to prevent material spillage when auger is not rotating. Cover plate shall have a welded-on auger choke plate to prevent the free flow of salt out of the spreader. Other holes and punching in the auger trough and its end plates shall not allow salt to free-flow out.
E. The bottom of the hopper chamber shall be a full length hinged operable trough to allow complete emptying, wash out and clean-up while spreader is mounted on the truck.
F. All hinges, latches and mounting hardware shall be heavy duty. Mounting plates attached to the dump body shall be stainless like the rest of the spreader, as shall their pins. Mounting plates shall attach with a minimum of two 1/2 inch cadmium plated (rust resistant) bolts. Bolt nuts shall be to the inside to eliminate a catch hazard. Back side of plates shall be completely covered with RTV sealant so when the plate is installed a permanent watertight seal is obtained all around the plate and it's fasteners. Excess sealant shall be removed.
G. A minimum 10-gauge cover plate shall be furnished to cover the complete hopper. Cover shall lie flat over the hopper so material can be unloaded directly over spreader or shall be able to be raised vertically to act as a rear spill plate.

3. AUGER

A. Auger shall measure 6 inches OD with continuous flighting, designed to promote a smooth steady flow of material to the spinner. Auger shall only move material from the right to the left side of the hopper.
B. The auger flighting shall be 4-inch pitch heavy duty taper design, 5/16 inch thick at the outside and 3/8 inch at the core. Flighting shall be securely welded to the shaft tubing. Shaft shall be fabricated from 2-1/2 inch schedule 80 pipe.

C. Auger tube shall be supported on both ends by minimum 1-1/4 inch shafts riding in precision self aligning greaseable ball bearings retained in an external 2-bolt mounting block. Bearing assembly shall be easy to change and service.
D. The auger shall be driven by a high torque/low speed Parker TE series 17.9 in^3 hydraulic motor with integral 30 pulse speed sensor (TE0295FS100FSAA).
E. Motor shall drive the auger through a #60 roller chain arrangement, providing a 2.6:1 drive ratio. A 26-tooth sprocket shall be installed on the 1-1/4 inch auger drive shaft and a 10-tooth sprocket on the 1-inch Parker motor shaft. A device shall be incorporated into the design allowing the motor to be pivoted, allowing adjustment of the roller chain tension. Sprockets shall be easy to remove and change, allowing easy gear ratio changes from 2.8:1 up to a direct 1:1 drive.
F. Hydraulic motor mounting end plate of spreader trough assembly shall be reinforced to prevent bending caused by an obstructed auger. Acceptable reinforcement method would be to make the end plate mounting area double thick or to install adequate horizontal stiffeners to prevent flex and bending.
G. A light sheet metal cover shall enclose the chain drive system. It shall be easily removable to allow lubrication and inspection of the chain.

4. SPINNER ASSEMBLY

A. The spinner assembly shall be rigidly mounted in a fixed position on the rear bumper of the truck with a 1-3/8" x 4-1/4" rectangular receiver, similar in function to an automotive trailer receiver hitch. It shall be held in place in a similar fashion, by a simple pin with hair spring cotter inserted through a choice of three depth placement holes. The complete spinner assembly shall be easily removed by disconnecting the two hydraulic quick connectors and the receiver hitch pin.
B. The spinner shall be an 18-inch diameter polyurethane (Thombert, Fluorocarbon or approved equal) equipped with six fins.
C. Spinner shall be driven counter clockwise by a nominal 3 in^3 4-bolt flange with 1 inch keyed shaft high torque orbital hydraulic motor attached to a precision made cast hub.
D. The spinner assembly plate shall be mounted between 20 and 24 inches off the ground.
E. The shield assembly shall be similar to what is commonly used on hopper spreaders, having adjustable side flaps around the spinner. A generic shield assembly will be made available to bidders for inspection.
F. Side flaps shall be fabricated from minimum 1/4 inch polyurethane, the same material as the spinner itself.
G. A stationary stainless steel deflector shield shall be installed in front of the spinner to protect the undercarriage of the truck.
H. The adjustable spinner shield flaps will be used to direct the ice control material downward to the road surface. The flaps shall extend a minimum of 1-inch above the spinner fins and a minimum of 1-1/2 inches below the spinner plate. Flexible rubber corner shielding shall be installed between the flap shields.
I. The spinner assembly, with it's shielding in the full open position, shall not extend beyond the outer edge of the truck.
J. There shall be a set of stainless steel tailgate side shields provided with each spreader, mounted to the dump body tailgate with a minimum of two 3/8 inch stainless bolts per shield. These bolts shall go through tubing welded through the tailgate. Shields shall be large enough to stay engaged within the body sidewalls when the tailgate is raised on the top hinges to an approximate 80-degree angle from vertical. They shall be adequate to not allow granular salt to free flow out or over the spreader sides.

SPECIFICATIONS
for
140 GALLON TAILGATE MOUNTED PRE-WETTER

1. GENERAL

A. Pre-wetter will be used to apply liquid ice control material onto granular material at the spreader spinner.
B. Pump system shall have a design rating of 4 GPM @ 1725 RPM.
C. Tank shall be of a trapezoidal shape with a 140 US gallon capacity.
D. System must be fully tested and calibrated to a 15 gallon per ton rate upon delivery to the Department. System shall be flushed and winterized with a suitable antifreeze solution to prevent damage.
E. All components, parts, pieces, fasteners, etc., shall be manufactured for nonferrous/non-rusting materials.
F. Liquid ice control material hoses shall be 1/2 inch polyester braid reinforced clear PVC, suitable for cold weather use.
G. All hoses and cables shall be long enough to allow the dump body tailgate to open for dumping over the spreader.

2. TANK

A. Tank shall be purpose designed to fit a Department snow removal truck tailgate in the open spreader charging position. When installed it shall square-off the rear of the truck to a point even with the back of the installed spreader.
B. Trapezoidal tank shall be approximately 19 inches wide at the top and 10 inches at the bottom. Height shall be 29 inches, overall length shall be 80 inches.
C. Tank shall be constructed from rotationally molded UV stabilized polyethylene dyed opaque orange. It shall have a minimum average wall thickness of 0.400 inch. Design liquid rating shall be a minimum of 14.5 lbs. per gallon.
D. There shall be three molded-in stiffeners, each approximately 6 inches wide, evenly spaced in the tank length.
E. Gallon markings shall be molded into the right rear face of the tank directly above the sump where the “pump-fill” connector will be installed.
F. Tank shall have a top center mounted 12-inch fill lid. Lid shall be tethered.
G. A 4" x 8" x 6" sump shall be molded into the right side bottom. Sump shall have three molded-in female 1-1/4" NPT threaded ports.
H. A suitable recess compartment shall be molded into the right tank end, large enough to hold the integral board mounted pumping system. Stainless steel bosses shall be molded into the tank to allow the entire pump system to be securely bolted into place, employing stainless steel bolts.
I. Additional stainless steel bolt bosses shall be molded into the right end to allow the installation of a stainless steel cover door over the pump system to protect it. Cover shall have a full length vertical stainless steel piano hinge bolted into the molded-in bosses down one side. The opposite side shall latch using two stainless steel thumbscrews threading into two of the molded-in bosses. Entire cover shall be easily removed.

3. FITTINGS

A. The left rear facing port shall have a 1-1/4 NPT plug screwed into it. It shall be for quick draining or clean-out of the tank.

B. The left port shall have a serviceable “Y-type” mesh strainer plumbed in so all anti-icing material pumped on via the bulk fill must pass through it.
C. Right port shall have a 1-1/4 inch three-way ball valve installed to allow bulk fill, shutoff or suction to be selected. A 1-1/2 inch male cam-lock connector shall be installed to allow bulk filling. A matching cam-lock cover cap shall be provided.
D. A 3/4 inch 2-way valve shall be installed into the suction plumbing. When this valve is closed, normal flow of the anti-ice material shall occur. When the 3-way valve is turned to the closed position and this valve opened, flush material shall be sucked into the plumbing and pumping system, throughly displacing all corrosive materials. An approximate 12-inch hose piece shall be attached to this fitting to allow easy flush material introduction via a plastic jug.

4. PUMP SYSTEM WITH FLOW METER

A. Material pump shall be a solid brass gear type, direct coupled to the hydraulic motor that will power the pre-wetter.
B. Pre-wetter hydraulic system shall obtain its flow directly from the valve motor manifold circuit identified for this purpose.
C. Flow control shall be electrically controlled by the spreader control in the truck cab, allowing precise metering of the oil flow.
D. Pump system shall incorporate a calibrated Raven model RFM15 turbine style flow meter. Flow meter signal shall be sent to the spreader control, allowing a precise ground oriented liquid application rate. Rate shall be adjustable up to the limits of the pump design output.

5. MOUNTING SYSTEM

A. Pre-wet system shall attach to the dump body tailgate via a full low carbon Austenitic 201, 304L, or Nitronic 30 stainless steel framework. Frame shall fully support the tank with three main hangar brackets.
B. Framework shall be fully adjustable, allowing the system to be mounted on most tailgate type and designs under standard production.
C. Polyethylene tank shall be retained in the stainless steel mounting cradle with three 2-1/2 inch wide UV stabilized nylon tie down straps. Straps shall have a heavy duty threaded t-bolt mount on each end. Bolts shall pass through the mounting framework and be tension adjustable with stainless nuts.

6. NOZZLE DELIVERY SYSTEM

A. Pre-wet liquid shall travel from the pump out to be applied on the spreader spinner.
B. Two brass nozzles, each rated 1.0 GPM flow shall be mounted onto a bracket, attached to the spreader spinner with stainless bolt. Nozzles shall be directed to spray on the centerline of the spinner.
C. A suitable cam-lock style quick connector shall be installed in the delivery line running to the nozzles. It shall be positioned in the line to approximately correspond to where the hydraulic quick connectors for the spinner assembly are, allowing the entire spinner assembly to be easily removed with the nozzle bracket assembly attached.
D. A one-way check valve system must be installed in the delivery line directly before or at the nozzles to prevent line drain down when the system is shut-off.

OPTIONAL EQUIPMENT THAT MAY BE REQUIRED

OPTION NO. 1: 16,000 LB. FRONT AXLE (16k)

Vendors are asked to bid the optional chassis upcharge cost of providing a wide track 16,000 lb. front axle (Dana Spicer I-160w or Meritor MFS-16-133a) with 16,000 lb. suspension and all related apparatus in lieu of the base front axle and suspension. Option shall not speed restrict vehicle to less than 70 mph. GVWR of truck will increase to 39,000 lbs.

OPTION NO. 2: EXTENDED-CAB (EC)

1. Vendor shall bid the complete cost to provide a chassis meeting requirements of the Single Axle Snow Removal Truck Chassis section but with a factory extended cab in lieu of the standard 2-man cab.
2. Rear seat shall be a full width bench with upholstery matching front seats.
3. Wheelbase shall increase by the amount of the additional cab length. CA dimension shall remain 102 inches.
4. All other items needing adjustment, inclusion, or change to properly and completely provide this option must be included. Other than the length of cab, other equipment and it's installation shall be basically indistinguishable from a regular cab truck.

OPTION NO. 3: CREW-CAB (CC)

1. Vendor shall bid the complete cost to provide a chassis meeting requirements of the Single Axle Snow Removal Truck Chassis section but with a factory 4-door crew-cab in lieu of the standard 2-man cab.
2. Rear seat shall be standard 3-person bench with upholstery matching front seats.
3. Wheelbase shall increase by the amount of the additional cab length. CA dimension shall remain 102 inches.
4. This option will require that the front axle and suspension be upgraded to include **OPTION NO. 1**: 16,000 LB. FRONT AXLE (16k) in lieu of the standard 14,000 lb., however this option must be separately ordered and the cost separately listed. Do not include front axle upgrade cost in this option. GVWR of truck will increase to 39,000 lbs.
5. All other items needing adjustment, inclusion, or change to properly and completely provide this option must be included. Other than the length of cab, other equipment and it's installation shall be basically indistinguishable from a regular cab truck.

OPTION NO. 4: LONG WHEELBASE (LWB)

1. Vendor shall bid the complete cost to provide a chassis meeting requirements of the Single Axle Snow Removal Truck Chassis section but with a 24 inch longer wheelbase. An extended blank frame space will exist between the back of the cab to the front of the body. Body, it's mounting, and all other aspects will remain unchanged.
2. If an underbody snowplow is ordered on this truck, it shall be mounted as far forward as possible. Department's intent is to field mount a wing on this truck or order either Option No. 16 or 17 LD Swing Wing on this truck employing the blank space.
3. All other items needing adjustment, inclusion, or change to properly and completely provide this option must be included. Other than the wheelbase change, other equipment and it's installation shall be basically indistinguishable from a regular cab truck.

OPTION NO. 5: DUAL SPREADER (DS)

1. Vendor shall bid the cost to provide a spreader with independent dual left and right spreader discharge arrangement. Dual discharge spreader shall employ the same style auger as a left discharge model but with rotational reverse capability. Both left and right anti-flow plates shall be provided.
2. Spreader spinners shall be plumbed in series. Side-to-side hydraulic lines shall be ran across the ICC bumper in simple rod loops, making them easy to remove and replace. Lines shall include proper hydraulic couplers so system can be operated with just one of the two spinners in place.
3. Spreader controls (auger/spinner rates) shall cause material rates to remain approximately the same, regardless of discharge side chosen. Discharge selector shall be an 2-position 4-way electric selector valve, easily shifted by operator demand. Switch will replace the “Extra” switch in the switch panel. It shall be labeled “Spread Right/Spread Left”.
4. System shall include a liquid selector valve to automatically direct the prewet solution to the same side as the dry material is discharging.
5. Dual spreader shall be equipped with dual spreader lamps, one on each side. Lamps shall be wired in conjunction with the selector switch, illuminating the material discharge side.

OPTION NO. 6: CENTER SPREADER (CS)

Vendor shall bid the cost to provide a spreader with a center material discharge and spinner in lieu of the standard left discharge and spinner. Auger shall be driven by a 5:1 ratio gear reduction box.

OPTION NO. 7: RIGHT SPREADER (RS)

Vendor shall bid the cost to provide a spreader with a right material discharge and spinner in lieu of the standard left discharge and spinner. All other aspects shall be the same as a left discharge model. Spreader lamp shall be re-positioned to the right side.

OPTION NO. 8: ZERO-VELOCITY SPREADER SYSTEM LEFT (ZVL)

1. Vendor shall bid the complete cost to provide and install a complete zero velocity spreader system in lieu of the standard spreader. Known acceptable spreader is a Monroe Accu-Place, any other must be pre-approved. System shall be complete and fully operational, capable of accurate material zero velocity placement up to 45 MPH.
2. All additional components and/or changes or alterations of existing systems required to provide and operate this system must be included, specifically but not limited to additional and modified hydraulic valve sections and spreader motors.
3. Proposed system shall fully integrate with the specified spreader control without additional electronic adapters or interfaces. Design shall allow the operator to directionally control the material output and also the pattern of discharge through an integrated directional controls panel. Directional control and pattern shall be adjustable from typical lane wide broadcast down to a narrow single wheel-track band.
4. A color review camera system shall be installed in the truck cab so the operator can visually see the direction of the ZV unit and confirm material output. Camera system to be:

A.. Color rearview mirror image camera system complete - single camera provided. 12VDC designed for mobile operations. Minimum 30 feet night visibility - NM Infrared. 0.000 LUX. 420 Lines Resolution. Nominal 3.6 mm lens. Weatherproof housing.

B. Minimum 7" flat panel monitor, minimum 3 camera inputs, easily switched between images or able to split screen and display 1, 2, or 3 camera inputs simultaneously. Dimming control or automatic light adjusting. Dash mounted swivel bracket. Auto power ON.

C. Fully shielded single waterproof IP68 rated cable and connectors of adequate and proper length to allow correct cable routing and slack.

D. An air line shall be installed into the taillight puffer line and routed to the camera lens to keep it clear of, same as the taillights.

5. ZV application head shall be easily removable like a regular spinner. Mounting system shall employ a twin automotive style 2" square receiver hitch, allowing head to be removed by simply removing two hitch pins and sliding the squares out of the receivers. All hydraulic and electrical connectors shall junction in a common spot.
6. A standard ‘summer’ bumper must be include, suitable to replace the ZV mounting bumper in the off-season.

OPTION NO. 9: ZERO-VELOCITY SPREADER SYSTEM RIGHT (ZVR)

Vendor shall bid the cost to provide a zero-velocity spreader system with a right material discharge in lieu of the typical left discharge system. All other aspects shall be the same as a left discharge model. Spreader lamp and camera shall be re-positioned to the right side.

OPTION NO. 10: WINTER TAILGATE LEFT (WTG-L)

1. Vendors are asked to bid the complete cost to provide and install a left side discharge winter tailgate assembly consisting of an integral spreader and minimum 160 gallon liquid prewet tank. Known acceptable winter tailgate is a Monroe RTS86X32-6-0W (00103634). Assembly shall replace the standard dump body tailgate, spreader and liquid tank. Standard dump body tailgate only shall be included and shipped with the truck unattached.
2. The tailgate side plates listed in spreader section 4.J. are not required. The bushings through the tailgate in dumpbody section 2.O. that the side plates bolt through are also not required. Also, the tailgate stiff arms required in dumpbody section 3. are not required.
3. Spreader shall incorporate all features and meet all functional requirements of a standard left spreader. Spreader side plates shall be extended upward and be designed into a minimum 160 gallon liquid tank directly above the auger trough. Liquid system shall incorporate all functional features of a standard 140 tailgate prewet system. Pump system enclosure shall be designed into the right end of the tank, system components shall be interchangeable with those in the standard 140 prewet.
4. A chopper auger with directional interrupted flighting shall be installed into the granular material opening between the bottom of the tank and trough to assure efficient feed of material into the discharge auger, moving material either to the left or right, to the side opposite of material discharge - this action is intended to keep material evenly distributed in the spreader trough. First 12" of each end of auger shaft shall not have any flighting, they shall only be installed in the approximate center 5 feet of the auger.
5. Winter tailgate shall have an additional 17.9 cubic inch hydraulic motor installed on the left side to drive the chopper auger. It shall be plumbed in series with the standard right side auger motor, powered by the exhaust oil from the first motor. Chopper auger shall be chain driven at the same 2.6:1 chain ratio as the material auger.

6. Main material discharge auger shall be the same 4 inch pitch design as called out in spreader section 3.B.
7. Hydraulic hoses, liquid lines, and cables shall be looped up to the top hinge point, long enough to allow winter tailgate to dump like a regular tailgate without damaging them. Hoses and lines must be supported by a minimum of one rubber bungee cord at the highest point to allow for flexing.
8. All lines and hoses that must pass from one side of the body to the other shall be routed so they are not damaged during dump action. Side-to-side hydraulic lines shall be ran across the ICC bumper in simple rod loops, making them easy to remove and replace.
9. Dump action hinges shall allow winter tailgate to balance from the hangar point, allowing assembly to hang and dump vertically with gravity as the dump body is raised.
10. A liquid level sight gauge tube shall be installed the full height of the rear next to the fill control valves.
11. Winter tailgate shall be powder coated orange for visibility even though it is stainless.
12. Vendors unfamiliar with this product or concept should make arrangements to see one before bidding. Contact Tim Nordholm in Equipment Services at 515-239-1607.

OPTION NO. 11: WINTER TAILGATE DUAL (WTG-D)

1. Vendors are asked to bid the complete cost to provide and install a dual discharge winter tailgate assembly consisting of an integral spreader and minimum 160 gallon liquid prewet tank. Known acceptable winter tailgate is a Monroe RTS86X32-6-DD (00094515). Assembly shall replace the standard dump body tailgate, spreader and liquid tank. Standard dump body tailgate only shall be included and shipped with the truck unattached.
2. The tailgate side plates listed in spreader section 4.J. are not required. The bushings through the tailgate in dumpbody section 2.O. that the side plates bolt through are also not required. Also, the tailgate stiff arms required in dumpbody section 3. are not required.
3. This spreader system will incorporate all features of the above winter tailgate left spreader system but be additionally equipped with an independent dual left and right spreader discharge arrangement. Dual discharge spreader shall employ the same style augers as a left discharge model (interrupted chopper and 4 inch pitch material) but with rotational reverse capability. Spreader controls (auger/spinner rates) shall cause material rates to remain approximately the same, regardless of discharge side chosen. Both left and right anti-flow plates shall be provided.
4. Spreader spinners shall be plumbed in series. Side-to-side hydraulic lines shall be ran across the ICC bumper in simple rod loops, making them easy to remove and replace. Lines shall include proper hydraulic couplers so system can be operated with just one of the two spinners in place.
5. Discharge selector shall be an 2-position 4-way electric selector valve, easily shifted by operator demand. Switch will replace the “Extra” switch in the switch panel. It shall be labeled “Spread Right/Spread Left”.
6. System shall include a liquid selector valve to automatically direct the prewet solution to the same side as the dry material is discharging. All lines and hoses that must pass from one side of the body to the other shall be routed so they are not damaged during dump action.
7. Dual spreader shall be equipped with dual spreader lamps, one on each side. Lamps shall be wired in conjunction with the selector switch, illuminating the material discharge side.

OPTION NO. 12: WINTER TAILGATE ZERO-VELOCITY LEFT (WTG-ZVL)

1. Vendors are asked to bid the complete cost to provide and install a left side zero-velocity discharge winter tailgate assembly consisting of an integral spreader and minimum 160 gallon liquid prewet tank and zero-velocity spinner. Known acceptable zero-velocity winter tailgate system is a Monroe RTS86X32-6-AP. Assembly shall replace the standard dump body tailgate, spreader and liquid tank. Standard dump body tailgate only shall be included and shipped with the truck unattached.
2. The tailgate side plates listed in spreader section 4.J. are not required. The bushings through the tailgate in dumpbody section 2.O. that the side plates bolt through are also not required. Also, the tailgate stiff arms required in dumpbody section 3. are not required.
3. Spreader shall incorporate all features and meet all functional requirements of the above winter tailgate left spreader system but be equipped with a zero-velocity spinner system. Zero-velocity system shall incorporate all functional features of the above optional zero-velocity spreader system.
4. A color review camera system shall be installed in the truck cab so the operator can visually see the direction of the ZV unit and confirm material output. Camera system to be:

    A.. Color rearview mirror image camera system complete - single camera provided. 12VDC designed for mobile operations. Minimum 30 feet night visibility - NM Infrared. 0.000 LUX. 420 Lines Resolution. Nominal 3.6 mm lens. Weatherproof housing.
    B. Minimum 7" flat panel monitor, minimum 3 camera inputs, easily switched between images or able to split screen and display 1, 2, or 3 camera inputs simultaneously. Dimming control or automatic light adjusting. Dash mounted swivel bracket. Auto power ON.
    C. Fully shielded single waterproof IP68 rated cable and connectors of adequate and proper length to allow correct cable routing and slack.
    D. An air line shall be installed into the taillight puffer line and routed to the camera lens to keep it clear of, same as the taillights.
    E. ZV application head shall be easily removable like a regular spinner. Mounting system shall employ a twin automotive style 2" square receiver hitch, allowing head to be removed by simply removing two hitch pins and sliding the squares out of the receivers. All hydraulic and electrical connectors shall junction in a common spot.
    F. A standard ‘summer’ bumper must be include, suitable to replace the ZV mounting bumper in the off-season.

OPTION NO. 13: WINTER TAILGATE ZERO-VELOCITY RIGHT (WTG-ZVR)

Vendors are asked to bid the complete cost to provide and install a right side zero-velocity discharge winter tailgate assembly in lieu of a typical left discharge system. All other aspects shall be the same as a left discharge model. Spreader lamp and camera shall be re-positioned to the right side.

OPTION NO. 14: IN-BED WEDGE TANK ANTI-ICE SYSTEM (AI-S)

Vendors shall bid the complete cost to provide and install a pair of wedge shaped tanks into the dump body of the truck and install a complete anti-ice pumping and application system on the truck between the rear frame rails. Dependent on whether the truck is also ordered with the standard 140 prewet system or optional winter tailgate, the standard prewet system operational function will either be designed to use the anti-ice tanks as a supply, or remain an independent stand-alone system if the additional tank is ordered.

1. WEDGE TANKS

A. Tank dimensions shall be approximately 111 inches long by 30 inches high sloped down to 24 inches in height by 24 inches wide. Capacity shall be nominal 263 gallons each, two tank capacity approximately 526 gallons. Tanks shall be provided and installed in pairs.
B. Tanks shall be of heavy duty design with reinforced corners. Design shall allow tanks to fit properly to the bottom, side and side-wall radius. and front of Department dump bodies.
C. Tanks shall be made of MDPE, 3/8 inch wall polyethylene (minimum), rated for 14-pound solutions and be UV stabilized.
D. Each tanks shall have a 3-inch diameter upper vent hole on both ends and a single rear 3-inch diameter lower output hole. Right tank lower output hole and left tank lower output hole shall be on opposite ends, so when installed both outlet ports face to the rear.
E. Each of the 3-inch upper vent holes shall come equipped with a 2" x 4" PVC pipe piece installed via a Uniseal slip fitting, the forward of each tank equipped with a vent cap and poly tubing to direct overflow outside the dumpbody and on t the ground. The rear holes shall have a screw-on pipe cap so they can act as a fill port, or so the vent can be moved if necessary. Uniseal slip fitting shall also be installed in each of the lower output holes.
F. Into each of the output holes a tank quick-coupling flange shall be installed. Coupling shall be manufactured by welding a 220 Banjo flange to a 4" x 2"ID (50mm/2.375 OD (60mm) stainless steel pipe that is then installed in the output hole Uniseal slip fitting.

2. MOUNTING

A. A stainless steel piping mounting kit shall be installed in the body to secure the tanks, holding them firmly in place when full, even with a fully raised body.
B. Tubing shall be 2-inch schedule 40 stainless pipe. Corners shall be manufactured 2" x 90^0 schedule 40 elbows properly welded to the straight pipe pieces. All welds, edges, and other surfaces that come in contact with the poly tanks must be smooth and free of anything that can damage the tank.
C. Upper and lower mounting pipes shall be installed into the body by slipping over 2"OD x 2" long schedule 80 pipe bases welded into the proper position inside the dump body, two on the body front wall and two on the body sides at the proper rear position. Each mount shall have a 5/8-inch hole through it, drilled to match and correspond with a matching hole in the tank retaining pipe brackets. A ½" x 4" hitch pin shall be installed through these holes to secure the retaining pipe and tanks in place.
D. A 2-inch schedule 40 stainless pipe support pipe shall be installed between the two lower retaining pipe brackets at their mid-point to prevent tank bowing-out when they are full. Center support shall be made to be easily removable for tank installation and removal and similarly be retained in place by ½" x 4" hitch pins.
E. Pump, valves, and anti-ice plumbing shall be installed between the truck rear frame rails is as easily serviceable manner as possible. System will typically be removed in the summer, so component access and serviceability are important.
F. Application bar(s) shall be installed in a manner so it is easily removable, either as a clamp-on part of the rear bumper assembly or other manner pre-approved by Equipment Services.

3. PLUMBING, PUMP, and APPLICATION SYSTEM

A. A 2-inch cam-lock coupler shall be attached to each tank output 220 Banjo flange, and directly to it a 90 degree fitting directing liquid from one tank to a Tee-fitting on the other output then through a 2-inch poly strainer before reaching the pump input.
B. Anti-ice hose shall be high quality spiral wound PVC water/suction/discharge hose. Clamps shall be all-stainless flat-band type. Automotive worm-type hose clamps are not acceptable. All fittings shall be stainless or PVC. Any plumbing component that will rust is not acceptable.
C. A Hypro 9306C-HM1C HYD pump/motor assembly shall be supplied, no exceptions. Pump/motor assembly shall be powered by the provided truck anti-ice hydraulic circuit.
D. Valve manifold shall be Tee-Jet 490 series with sealed Weather Pack connectors, no exceptions. Manifold shall have 1-1/2 inch female NPT inlet and outlet ports. Valve shall be equipped with cam-lock connectors to make it easily removable and serviceable. Cam-lock release levers shall be plastic zip-tied to prevent unintentional unlocking.
E. A Raven RFM-100 flow meter shall be supplied, no exceptions, with hose saver connectors.
F. Tanks shall be able to be bottom-up pressure filled by a Department brine storage tank transfer pump system or gravity filled from the top through a single 2-inch hose, equalizing both tanks filling through the pump cross-plumbing.
G. Transfer pump pressure filling shall be through a left side mounted 2-inch cam-lock male nipple with cap. Directly behind cam-lock shall be a ON/OFF ball valve. Tanks shall be capable of accepting up to 200-gallons per minute from the transfer pump. This system shall also allow reverse action, allowing brine to be pumped off truck and back into the bulk storage tanks.
H. Application spray bar shall be a 3-section design constructed of 1-1/2 inch schedule 40 stainless pipe. Bar shall be one piece construction with vertical side sections and horizontal center section. Center section height shall be set at approximately 15-inches from the ground when installed. Main center boom section shall be capped on both ends, to that a 90 degree elbow welded to form the vertical section. A capped vertical bar shall be installed to the elbow (elbow is not part of vertical bar). Valve brine output shall be directed to the top of each vertical and to the center of the main horizontal bar. Each shall have a 15 PSI check valve installed to provide head-pressure and prevent dripping.
I. When/as delivered, the bars shall not be drilled for nozzles. The Department will drill, provide, and position nozzles as desired by each using location.
J. Anti-ice system shall have the capability to apply brine solution though any one (1) section of boom (right, center or left) or any combination of sections as directed by the controller.

4. SPECIAL CONSIDERATIONS

A. If the in-bed wedge tank anti-ice system is ordered on a truck without the standard 140 prewet system or optional winter tailgate liquid system, the prewet system functionality and pump are still required.
B. Prewet pump system shall be remounted in a frame mounted (typically left side) stand alone plastic NEMA enclosure box.
C. System shall draw brine from one of the wedge tanks and operate in the same manner as the separate tank mounted system. All aspects of the prewet system shall be the same as described in the 140 Prewet System section.

D. If a separate standard 140 prewet system or optional winter tailgate system is ordered with the in-bed wedge tank anti-ice system it shall be designed to work in conjunction with the anti-ice system or independently.

OPTION NO. 15: RADIUS DUMP BODY WITH 150 GALLON PREWET (RDS/150PW)

Vendors are asked to bid the complete cost to replace the standard dump body, tailgate spreader, and prewet system with an integral Radius Dump Body system. Approved model is a Monroe Snow & Ice RDS120-96-56. To be considered as an approved equal, other brand radius dump bodies must also be under current standard production, also being marketed on an interstate level. They must be suitable in design for use on a heavy duty snow removal truck similar to that of the Department design without major modification.

1. GENERAL

A. Body shall be versatile with the ability to be used as a dump body or as a spreader to allow material to discharge through the tailgate onto a spinner assembly by way of an integral center conveyor assembly.
B. Body shall be fabricated of A569 mild steel.
C. Body shall be equipped with removable top grate screen panels.
D. Body shall have a front cab shield. Shield shall extend forward 16 inches and be no less than 78 inches wide. Shield shall be angled so excess material is directed into body.
E. A steel slip-in conveyor cover shall be provided, fabricated from the same A569 steel as the body.
F. Structural full coverage steel fenders shall be installed over the drive tires to protect the body sides and also to provide a place to install a minimum 75 gallon liquid tank on each side. The fenders shall be chassis mounted to allow the body to raised and lowered without movement allowed to pre-wet tanks.
G. The hydraulic valve assembly shall be relocated from between the frame rails to outside the frame rail on the left side of the truck, directly behind the fuel tank. Valve bank shall be enclosed in a weather tight enclosure with easily removable cover, preferably the same enclosure as standard.
H. All applicable items from the standard dumpbody outfitting shall apply, suck as lighting, retroreflective markings, tail light puffer, etc. This body does not require a vibrator system.

2. DIMENSIONS & MATERIALS

A. The body shall be 10 feet in length, top inside width shall be 87 inches, and with the total outside width being 96 inches.
B. The body height dimensions shall be: Sides, floor to top, 44 inches, from bottom of longsill to top, 56 inches. Tailgate shall be 50 inches from floor to top, 62 inches from longsill to top.
C. The body capacity shall be nominally 7 cubic yards water level.
D. The unit shall be continuously welded 100% throughout.
E. The sides, front and tailgate shall be manufactured of 3/16 inch A569 steel. The longsills shall be fabricated from 1/4 inch A569 steel, 14 inches deep. The longsills shall be joined as follows:
F. Sections of 4" x 5.4# channel are welded every two feet the length of the spreader at the base of the longsills, where the longsills are then boxed in with 1/4 inch A569 steel.

G. Then there shall be 3/16" x 3" x 3" structural angle welded every 12 inches the full length of the conveyor at the top of the longsills.
H. The unit shall have a 1/4 inch A569 steel replaceable floor with 3/16 inch removable chain guards.
I. The sides shall be brake formed from a minimum 3/16 inch steel to a radius of 43 inches.
J. The boxed top rail shall be external dirt shedding design with a minimum of 3/16 inch.
K. The front shall be sloped to accommodate a headlift cylinder with partial doghouse and conform with the radius of the body and shall be 100% welded on the inside and outside.
L. The rear of the body shall be supported by two pieces of 3/16 inch A569 steel plate contoured to the radius of the body and welded 100% on both sides.
M. Additional reinforcement will be provided by a 3/16 inch formed box section, placed at the rear of the spreader body and tied to two rear posts formed from 3/16 inch A569 steel. Together, they shall provide support at the rear of the body.
N. The body hinge shall have 2 inch stainless steel pins that are removable and shall incorporate greaseable composite bushings.

3. TAILGATE

A. The tailgate shall be a minimum of 6 inches higher than the sides of the body. The tailgate shall be manufactured from 3/16 inch A569 steel with a boxed perimeter of 7 gauge formed channels.
B. The tailgate shall be double acting with a squared perimeter, having two horizontal braces of 7 gauge material full width of the tailgate.
C. The material door shall extend 16 inches into the interior of the body to prevent material from escaping through the partially opened door over the conveyor.
D. The door opening shall be 21 inches in width by 8-1/2 inches in height and shall be manufactured of 3/16 inch material. The door shall be adjustable by a heavy duty screw type operated adjustment mechanism and shall include a ruler for gate height opening.
E. The tailgate shall have 1" x 4" bar stock tailgate hardware with 1-1/4 inch hardened pins.
F. The tailgate latches shall be 1 inch flame cut, with each latch being adjustable with threaded 3/4 inch clevis and keeper pins.
G. The latch shall be an over center type. The latch shall be opened by a single air cylinder that is easily removed with a manual lever available.

4. CONVEYOR

A. The body conveyor shall be 34 inches wide and shall have 26,000 pound tensile strength per strand pintle chain, with 1-1/2" x 1/2" bar flights on 4-1/2 inch centers, welded on both top and bottom.
B. Conveyor shall be driven by two 6:1 Rawson spur gearboxes each with high torque/low speed (Parker brand preferred) hydraulic motors. One motor must have speed sensor for closed loop ground speed spreader control system.
C. There shall be 8 tooth case hardened to 40-48 Rc self cleaning sprockets keyed to the 2 inch drive and idler shafts.
D. Conveyor drive shaft shall have heavy duty, dust sealed self-aligning four bolt flange bearings.

E. There shall be a heavy-duty idler assembly with 1-1/4" adjuster bolts that will provide 9" of adjustment for proper conveyor chain tension by use of slide rail style adjusters.

5. LEFT SPINNER ASSEMBLY

A. The spinner assembly shall be stationary, mounted to discharge at the left front corner of the body, fed by a drop chute.
B. Spinner shall be mounted via a receiver tube so it can be removed. Hydraulic lines shall have Parker quick couplers. Spinner body is manufactured from 12-gauge material. There shall be three adjustable spinner deflectors, for directing material from the spinner disc. The material spread pattern shall be controlled by means of a center diverter located above the spinner disc, and with adjustment of the spinner body that is directed by holes drilled into the receiver mounts that can move the spinner assembly either forward or back of the conveyor.
C. The spinner motor shall be high torque/low speed mounted directly to the spinner disc with a cast hub.
D. The spinner disc shall be 24 inches in diameter with six replaceable fins. Spinner to be manufactured from 3/16 inch low carbon Austenitic 201, 304L, or Nitronic 30 stainless steel.

6. HYDRAULIC HOIST

A. The hoist shall be of a telescopic design and have a trunnion mounting.
B. The hoist shall be designed to operate up to 2,500 PSI, and shall be self-bleeding.
C. The hoist shall have a 1/4 inch wall construction with bronze glands and pistons to assure a smooth and durable bearing surface. The glands shall each be a continuous cast bearing, SAE-660 bronze with a tensile strength of 44,000 PSI.
D. The cylinder head and piston shall be of a “ductile” continuously cast iron, with a tensile strength of 60,000 PSI.
E. Each cylinder shall be internally sealed. The inside seals shall be of a u-cup design made of nitral packing.
F. The cylinder shall have a Melonized/Q.P.Q® running surface. The Melonized surfaces shall have a predominance of single-phase epsilon nitride. The nitride shall cover the entire cylinder surface. This shall give the cylinder superior wear and corrosion resistance and also shall have superior wear and fatigue properties.
G. The cylinder rod shall be C1045/C1050 steel with a tensile strength of 80,000 to 100,000 pounds.
H. The cylinder tubing shall be D.O.M. tubing, drawn over a mandrel, and shall have tensile strength of 70,000 pounds. The tube shall have a surface hardness of 80º Rockwell “B”.
I. The cylinder shall dismantle easily and overlap between stages for greater stability.
J. The trunnion collar shall be oscillating.
K. The cylinder shall be double acting in all stages.
L. Each rod or pin eye shall have a grease fitting.

7. PREWET LIQUID SYSTEM

A. A complete and fully operational prewet system shall be supplied meeting all function and practical requirements of the base 140 gallon system.

B. Two minimum 75 gallon trapezoidal shaped poly tanks must be provide, one on each side mounted directly above the drive tires on the structural steel fenders, 150 gallon combined liquid capacity. Tanks must meet the same polyethylene weight and density specifications as the 140 gallon tank, however these may be left natural white.
C. Liquid pump apparatus shall be identical to that in the 140 system but shall be mounted on the left side directly in front of the left tank in a suitable weather proof enclosure.
D. Tanks shall include valves to allow each to be shut-off and not used (regardless of side - no default tank) or used together as a single reservoir.

OPTION NO. 16: WING HYDRAULICS (WH)

1. Vendor shall bid the complete cost to provide two additional hydraulic sections for use with a 2-function wing assembly in conjunction with an underbody snowplow (UBP) as the UBP option has used the existing base valve sections.
2. If the Department will field install the wing, the section ports shall be plugged on the valve stack. However, the appropriate cable controls must be provided, installed, and labeled.
3. If the truck is ordered with both the UBP and a wing, wing shall be fully installed and operational.

The following are required additions:
Add two additional hydraulic sections:

Section 8.	LD Wing Lift	14 GPM	3W/3P
Section 9.	LD Wing Slide	14 GPM	4W/3P

Add Lever 5 to base bank:

Lever 5.	LD Wing Up/Dn	Dual Axis
	LD Wing Slide In/Out	

OPTION NO. 17: LIGHT DUTY MID-EXTENDABLE WING - L or R (LDW)

1. Vendor shall bid the complete cost to provide and install an extendable tube light duty mid-mount wing. Acceptable known brands/models are the Coates TW128RL and Monroe 415-9008-000. To be considered as an approved equal, other brand wings must also be under current standard production, also being marketed on an interstate level. They must be suitable in design for use on snow removal trucks similar to that of the Department design without major modification.
2. Wing design shall be universal, able to be mounted right or left with a straight moldboard. Design shall also be available with a specific side left or right tapered moldboard at no extra charge. Moldboard configuration will be stated at time of order.
3. Tube assembly shall not be mounted level, it shall hang slightly lower to the moldboard end to allow moisture to drain out.
4. Fully installed wing assembly shall have a minimum of 8 inches ground clearance under a new cutting edge in the tucked transport position.
5. A safety chain or other device must be provided to secure the wing in an up transport position.
6. Wing mounting plates and tubes shall be black, moldboard shall be orange.
7. A wing lamp (same make/model as sander lamp) shall be provided to illuminate the wing path and discharge. It shall connect to the wing lamp receptacle. Lamp must be aimed down and not to the rear.

OPTION NO. 18: LIGHT DUTY MID-MOUNT WING - L or R (LDMW)

Vendor shall bid the complete cost to provide and install a custom modified version of a Coates type mid-mount light duty wing per specific Department requirements. A working model will be made available to prospective vendors for evaluation.

1. This wing option is only available on an extended wheelbase type truck, intended to work in conjunction with an underbody snowplow as described in Option 21 below. Truck must be ordered with Option 16 Wing Hydraulics if this option is ordered on or with a truck intended to have an underbody snowplow.
2. This wing will be a double function compound linkage design employing two hydraulic cylinders, one to raise and lower the entire side assembly, the second to adjust the width path.
3. Base wing frame mounting plate system shall be universal, able to accept either a left or right moldboard, or allow the installation of an additional second moldboard by the Department at a later date without extensive modification. Moldboard side configuration will be stated at time of order.
4. Major components will consists of two Coates type frame mounting plates (one on each side) with raise cylinder mount, two under-the-truck cross frame bulkhead assemblies that tie the two sides together but allow driveshaft clearance, the square raise-tube assembly, width cylinder, pivot assembly, and moldboard.
5. A Coates type lift cylinder and associated cantilever top arm and chain shall be provided for the side the moldboard is ordered on (right or left).
6. Under-truck cross frame bulkhead assemblies, one front and one rear, shall bolt between the two frame plates and tie the sides together. Each shall consist of a 8" x 3/4" top plate with 12" x 12" side drop plates reinforced with two ½ inch thick triangular gusset plates. These gusset plates will form the cavity surround the driveshaft.
7. Each bulkhead side shall have a 8 inch piece of 6" x 6" x ½" angle welded to the underside of the top plate, creating the bolt flange where the bulkhead assembly will bolt to the inside of the Coates frame plates up tight against the underside of the truck frame.
8. Universal non-side specific square tube raise assemblies shall consist of a 36 inch long piece of 7" x 7" x 3/8" tubing into which a 38-1/4 inch long piece of 6" x 6" x 3/8" tubing shall be inserted and welded around both ends. Inner tube shall extend 3 inches out of working end.
9. On the flush inside end, a 7 inch piece of heavy wall tubing shall in installed through, 3-1/2 inches in from the end and 3 inches up from the bottom. Tubing shall accept a 1 inch grade 8 bolt with locknut, and act as the inside up/down pivot for the tube assembly. Tubing piece shall have a grease zerk in the center to allow lubrication of pivot point.
10. A typical Coates type triangular locator reinforcement shall be affixed to the top of the 7" x 7" tube to allow the tube to correctly slide up and down in the Coates type frame plate.
11. To the 3 inch exposed end of the 6" x 6" tube a typical Coates type moldboard attachment plate shall be welded, with backside reinforcement gusset.
12. To the front side of the 7" x 7" tube the swing cylinder shall attach. Each end of the cylinder will attach through a cross type tubing u-joint. U-joint shall be fabricated with 1-1/2" OD x 1" ID tubing to accept 1 inch pins. Front of fixed non-moldboard mount shall be approximately 16 inches in from end of 7" x 7" tube end.
13. Swing cylinder shall be a 3-1/2" x 8 inch stroke meeting Department requirements. Swing cylinder hoses shall have quick couplers to allow easy cylinder removal with the moldboard. Couplers shall be mounted to the front side of the Coates type frame plate in a manifold. Couplers shall be installed in a vice-versa manner to prevent cross-hook-up.
14. Moldboard will attach and pivot in and out via a typical Coates type attachment knuckle.

15. Moldboard shall be a modified straight Coates type design with the exception that the attachment point shall be moved to the end of the moldboard and inclined 10 degrees from what a typical Coates plate would be, making the moldboard side-specific. Moldboard shall be 8 feet long by 21 inches high, less cutting edge. With cutting edge installed combined assembly shall be 24 inches tall.
16. Hydraulic hoses shall be 3/8 inch, cylinders shall have 3/8 inch (-6) ORB ports.
17. Fully installed wing assembly shall have a minimum of 8 inches ground clearance under a new cutting edge in the tucked transport position.
18. A safety chain or other device must be provided to secure the wing in an up transport position.
19. Completed assembly must be installed to work properly and in conjunction with the Option 20 underbody plow. Underbody plow moldboard shall discharge correctly into path of wing.
20. Wing mounting plates and tubes shall be black, moldboard shall be orange.
21. A wing lamp (same make/model as sander lamp) shall be provided to illuminate the wing path and discharge. It shall connect to the wing lamp receptacle. Lamp must be aimed down and not to the rear.

OPTION NO. 19: LIGHT DUTY MID-MOUNT WING - DUAL (LDMW-D)

Vendor shall bid the complete cost to provide and install a custom modified version of a Coates type mid-mount light duty wing with both left and right moldboards per specific Department requirements. A working model will be made available to prospective vendors for evaluation.

1. This wing option is only available on an extended wheelbase type truck, intended to work in conjunction with an underbody snowplow as described in Option 21 below. Truck must be ordered with Option 16 Wing Hydraulics if this option is ordered on or with a truck intended to have an underbody snowplow.
2. This wing will be a double function compound linkage design employing two hydraulic cylinders, one to raise and lower the entire side assembly, the second to adjust the width path.
3. Base wing frame mounting plate system shall be universal, able to accept either a left or right moldboard, or allow the installation of an additional second moldboard by the Department at a later date without extensive modification. Moldboard side configuration will be stated at time of order.
4. Major components will consists of two Coates type frame mounting plates (one on each side) with raise cylinder mount, two under-the-truck cross frame bulkhead assemblies that tie the two sides together but allow driveshaft clearance, the square raise-tube assembly, width cylinder, pivot assembly, moldboard, and selector valve.
5. A Coates type lift cylinder and associated cantilever top arm and chain shall be provided for both sides to accommodate the dual wings.
6. Under-truck cross frame bulkhead assemblies, one front and one rear, shall bolt between the two frame plates and tie the sides together. Each shall consist of a 8" x 3/4" top plate with 12" x 12" side drop plates reinforced with two ½ inch thick triangular gusset plates. These gusset plates will form the cavity surround the driveshaft.
7. Each bulkhead side shall have a 8 inch piece of 6" x 6" x ½" angle welded to the underside of the top plate, creating the bolt flange where the bulkhead assembly will bolt to the inside of the Coates frame plates up tight against the underside of the truck frame.
8. Universal non-side specific square tube raise assemblies shall consist of a 36 inch long piece of 7" x 7" x 3/8" tubing into which a 38-1/4 inch long piece of 6" x 6" x 3/8" tubing shall be inserted and welded around both ends. Inner tube shall extend 3 inches out of working end.

9. On the flush inside end, a 7 inch piece of heavy wall tubing shall in installed through, 3-1/2 inches in from the end and 3 inches up from the bottom. Tubing shall accept a 1 inch grade 8 bolt with locknut, and act as the inside up/down pivot for the tube assembly. Tubing piece shall have a grease zerk in the center to allow lubrication of pivot point.
10. A typical Coates type triangular locator reinforcement shall be affixed to the top of the 7" x 7" tube to allow the tube to correctly slide up and down in the Coates type frame plate.
11. To the 3 inch exposed end of the 6" x 6" tube a typical Coates type moldboard attachment plate shall be welded, with backside reinforcement gusset.
12. To the front side of the 7" x 7" tube the swing cylinder shall attach. Each end of the cylinder will attach through a cross type tubing u-joint. U-joint shall be fabricated with 1-1/2" OD x 1" ID tubing to accept 1 inch pins. Front of fixed non-moldboard mount shall be approximately 16 inches in from end of 7" x 7" tube end.
13. Swing cylinder shall be a 3-1/2" x 8 inch stroke meeting Department requirements. Swing cylinder hoses shall have quick couplers to allow easy cylinder removal with the moldboard. Couplers shall be mounted to the front side of the Coates type frame plate in a manifold. Couplers shall be installed in a vice-versa manner to prevent cross-hook-up.
14. Moldboard will attach and pivot in and out via a typical Coates type attachment knuckle.
15. Moldboards shall be a modified straight Coates type design with the exception that the attachment point shall be moved to the end of the moldboard and inclined 10 degrees from what a typical Coates plate would be, making the moldboard side-specific. Moldboard shall be 8 feet long by 21 inches high, less cutting edge. With cutting edge installed combined assembly shall be 24 inches tall.
16. A electric selector valve(s) shall be installed into the wing hydraulics to allow side selection of the moldboard, both cannot operate at the same time (Force 9014-001 or equivalent). In the truck cab, a simple toggle switch (DPDT, 2-postion, ON/ON) shall be attached by a small welded tab to the front of the wing joystick metal lever, allowing easy side selection. Valve shall be mounted under truck body in a convenient position allowing servicing.
17. Hydraulic hoses shall be 3/8 inch, cylinders shall have 3/8 inch (-6) ORB ports.
18. Fully installed wing assembly shall have a minimum of 8 inches ground clearance under a new cutting edge in the tucked transport position.
19. A safety chain or other device must be provided to secure the wings in an up transport position.
20. Completed assembly must be installed to work properly and in conjunction with the Option 20 underbody plow. Underbody plow moldboard shall discharge correctly into path of wing.
21. Wing mounting plates and tubes shall be black, moldboard shall be orange.
22. Wing lamps (same make/model as sander lamp) shall be provided to illuminate the wing path and discharge. It shall connect to the wing lamp receptacle and switch side-to-side as per the wing selector. Lamp must be aimed down and not to the rear.

OPTION NO. 20: MEDIUM DUTY FRONT WING (MDFW)

Vendor shall bid the complete cost to provide and install an 8 foot moldboard front bumper wing. Known acceptable models are a Monroe MPW-8 and Schmidt-Wausau style PW9. To be considered as an approved equal, other brand wings must also be under current standard production, also being marketed on an interstate level. They must be suitable in design for use on snow removal trucks similar to that of the Department design without major modification. Cost shall be universal for either a right or left discharge configuration as specified.

1. GENERAL REQUIREMENTS

A. Wing will have a 9-foot moldboard with 8-foot cutting edge and single pusharm.
B. The wing design must incorporate a float system independent of the post hydraulic cylinder, which provides approximately 3 inches mechanical toe float.
C. Installation shall not cause the truck to exceed 96-inches with the moldboard off.
D. The toe end of the cutting edge shall be rounded to prevent gouging.
E. Wing hydraulics shall contain a counterbalance valve to prevent hydraulic creep down, Sun part #CBCA-LHN or equal.
F. Wing mounting shall be powder coated black, moldboard shall be orange.
G. Main moldboard pins must be tapered at end to aid moldboard installation.
H. A safety chain or other device must be provided to secure the wing in an up transport position.

2. MOUNTING

A. The Wausau wing installs to the front of the truck via a 6" x 4" rectangular tube installed through the truck snow plow hitch side plates. Tube is approximately 8-feet long with a minimum 1/2 inch wall thickness.
B. The 6-inch width and the approximate 8-foot length shall be parallel to the ground when the wing is installed on the truck.
C. The tube mounting height (bottom to ground) must be 18 inches. The front post shall be attached accordingly to get proper wing mounting height.
D. The wing heel stiff-arm shall have a spring cushion installed on it.
E. Front post installation shall provide 8 inches of vertical lift to the toe with a cutting edge installed.
F. Installed tube/post must not interfere with the truck's tilt hood.
G. A wing lamp (same make/model as sander lamp) shall be provided to illuminate the wing path and discharge. It shall connect to the wing lamp receptacle. Lamp must be aimed down and not to the rear.

3. FRONT AXLE & SUSPENSION CHANGE

Requesting this wing option on any truck will require the front axle to be upgraded as per **OPTION NO. 1**: 16,000 LB. FRONT AXLE above. In addition to the required 8,000 lb. spring, the wing moldboard side shall be supplemented with an adjustable but passive front spring assist air bag suspension booster to compensate for the wing moldboard/post weight.

4. SPECIAL CONSIDERATION for FUEL TANK

If this front bumper wing is specified in a LEFT discharge version the fuel tank shall be relocated to the right side.

OPTION NO. 21: MEDIUM DUTY REAR-REAR WING (MDRRW)

Vendor shall bid the complete cost to provide and install a Monroe style MJW8 junior wing or approved equal wing directly in front of the drive axle assembly. If ordered in conjunction with the UBP option, the truck must be an extended or crew cab version for adequate frame length. To be considered as an approved equal, other brand wings must also be under current standard production, also being marketed on an interstate level. They must be suitable in design for use on a heavy duty snow removal truck similar to that of the Department design without major modification. Cost shall be universal for either a right or left installation as specified.

1. GENERAL REQUIREMENTS

A. Wing will have an 8-foot moldboard with 8-foot cutting edge, single pusharm and full moldboard trip.
B. Moldboard shall be a funnel design, approximately 24 inches tall at the toe end and 36 inches tall at the heel end. It shall have 5 ribs. Cutting edge shall be a standard pattern 8-foot AASHO punched drag blade.
C. Wing moldboard attachment must incorporate a full moldboard trip feature with automatic moldboard reset. Trip shall allow the wing moldboard to completely trip up and over an object when hit, then automatically reset. Trip edge designs are not acceptable.
D. Trip design shall incorporate a transport pin safety device. Pin shall be painted safety red.
E. A safety chain or other device must be provided to secure the wing in an up transport position.
F. The wing design must incorporate a float system independent of the post hydraulic cylinder, providing approximately 3 inches of mechanical toe float.

2. INSTALLATION REQUIREMENTS

A. Installation shall not cause the truck to exceed a 96-inch width with the moldboard removed. The toe end of the cutting edge shall be rounded to prevent gouging.
B. An adjustable needle valve flow restrictor shall be installed in both the moldboard raise and lower to allow an operator to adjust the speed of the wing to their comfort level.
C. Wing hydraulics shall contain a counterbalance valve to prevent hydraulic creep down, Sun part #CBCA-LHN or equal.
D. Wing mounting shall be powder coated black, moldboard shall be orange.

3.MOUNTING

A. The wing shall be mounted to the truck frame directly in front of the axle assembly. The push arm rear attachment point weldment will mount behind the rear axle, effectively becoming the rear bumper. Attachment point shall not extend out further than the width of the tire sidewalls. Rear attachment point shall incorporate a safety chain to secure the wing in an up position.
B. When used in conjunction with a normal 11 foot moldboard front snow plow or the optional underbody snow plow (UBP), wing shall operate in harmony with these devices. Spoils from the plows shall discharge directly into the wing path without leaving a berm strip on the road surface.
C. Push arm shall incorporate a compression spring into its design.
D. Push arm shall attach via a fabricated universal joint on each end, allowing independent end movement without binding in all wing positions.
E. Forward post installation shall provide 8 inches of vertical lift (with cutting edge installed) to the toe without a cutting edge.
F. Main moldboard pin must be tapered at end to aid moldboard installation.
G. A wing lamp (same make/model as sander lamp) shall be provided to illuminate the wing path and discharge. It shall connect to the wing lamp receptacle. Lamp must be aimed down and not to the rear.

OPTION NO. 22: UNDERBODY SNOW PLOW (UBP).

Vendors are asked to bid the complete cost for providing and installing a folding moldboard spring cushion moldboard trip underbody snowplow. Approved model is a Monroe FMB 050-9011-000IA. To be considered as an approved equal, other brand underbody snow plows must also be under current standard production, also being marketed on an interstate level. They must be suitable in design for use on a snow removal truck similar to that of the Department design without major modification.

1. Moldboard shall be 11 feet long. Design and mounting shall provide a vertical moldboard attack angle to permit use of carbide insert grader blades. Moldboard shall move up and down vertically via a parallel linkage arrangement.
2. Plow shall have a solid mounted non-moving one piece circle cut from 1 inch thick steel. Bottom of circle shall be mounted no lower than 20 inches from ground level. This is a critical dimension.
3. Rotational center pin shall be 5 inch diameter with grease fitting for lubrication.
4. Rotation circle hold-down block shall be lined with 3/8 inch UHMW poly wear material insert to ease circle movement.
5. Moldboard design shall include provisions to prevent hinge seizing, either non-corroding components or adequate lubrication features for both hinge assemblies. If grease fittings are employed, they shall be positioned to prevent damage during all movements.
6. The moldboard shall consist of two primary components. The upper deflector shall be of 5/8 inch plate formed to a 13.250 inch radius. The lower deflector shall be 3/4" x 9" plate formed to a 13.250 inch radius also providing connection point to the moldboard. The lower and upper deflector must be mated together with a hinge assembly of 1-1/4"OD x 0.219" wall thickness DOM high strength tube. The inner hinge rod shall be 3/4 inch stainless steel shaft with encapsulated ends. The chord measurement with the moldboard in the open position shall be 20 inches not including the cutting edge. The moldboard shall be manufactured from 3/4 inch steel and shall be heat treated and provide an offset for cutting edge and moldboard support.
7. Moldboard offset shall be suitable for attaching 7/8 inch thick by 5 inch carbide grader blade assemblies. Moldboard shall have standard AASHO blade pattern punching to accept one 3-foot section and two 4-foot sections, with the 3-foot blade in the center. Blade(s) shall attach using 5/8 inch diameter blade bolts. The Department will supply and install the carbide cutting edges.
8. Plow will have dual 4-inch reversing cylinders with a 1,800 PSI hydraulic cushion block mounted between the cylinders.
9. Hoses ran along the back of the moldboard shall be retained by hydraulic tubing clamps, not ran in corrosion prone steel tubing. Tubing clamps shall have a welded-on bolt plate, plastic multi-tube insert, and bolt-on top plate.
10. Moldboard rotation stops will need to be installed to prevent the plow from being rotated beyond the stroke of the cylinders, preventing damage to them.
11. When rotated into a transport position, no point of the plow or moldboard shall extend beyond the width of the truck tire sidewalls. This shall be determined by running a string line from the front tire sidewall to the rear tire sidewall. No plow part can extend beyond this line.
12. Vendor shall bid to install the snowplow as per specialized Department requirements. It is highly recommended that prospective vendors see and thoroughly research this installation. Vendors are encouraged to view a recent Department installation, which will set the minimum acceptable level of workmanship, design and performance. Arrangements to view an installed plow may be made by contacting Tim Nordholm in Equipment Services at 515-239-1607.
13. Underbody snowplow shall be powder coated black to match the truck frame.

14. The following items will need to be modified or taken into consideration for the correct installation of the under body plow. Vendor must work these details out with the equipment provider/outfitter before the bid is submitted. Solution shall be submitted to Equipment Services for pre-approval.

    A. Special consideration shall be given to the fuel tank. Because of the moldboard length and swing arc, the standard fuel tank may be too low. Factory fuel tank may simply have to be raised, or it may have to be changed to a slim tank of approximately the same capacity. Suggested size is 16 inches tall by 25 inches wide by 60 inches long with an approximate 100 gallon draw capacity. Known acceptable tank is manufactured by Riverside Tank of St. Clair, MI. (#162565).
    B. Special consideration must be given to the cab access steps. When the factory steps and/or fuel tank are moved up, relocated, or replaced, additional cab steps are required. Ground level to first step height shall be nominally 16 inches, distance between all subsequent steps shall not exceed 16 inches. Step gating shall be non-slip Bustin grating.
    C. Consideration shall be given to other equipment to be used in conjunction with this plow. If the plow is installed on a truck with a right discharge wing, the plow should store in a left position. And vise-versa. If the truck has a left wing, the plow should store in a right position.

OPTION NO. 23: SCHMIDT/WAUSAU SQH FRONT PLOW HITCH SYSTEM (SQH)

Vendors are asked to bid the complete cost from providing and installing an OEM Schmidt/ Wausau SQH front plow hitch system in lieu of the standard front hitch and snow plow lift system. Any brand or design other than an OEM hitch purchased from Schmidt/Wausau is not acceptable. Hitch system shall include the spring loaded quick attachment pin apparatus to allow no-tool plow attachment. All hydraulic hoses shall terminate at the front of the truck with appropriately sized and marked full flow pintle style Parker SM series quick couplers. Hitch shall be a bolt-on system, set at 38 inches to the top when delivered. It must be height adjustable $\pm$ 4 inches in approximate 1 inch increments.

The Department intends to separately purchase and install a 12 foot to 14 foot long European style Wausau sectional trip plow for use on trucks ordered with this hitch. Attachment methods and components shall be of adequate size and strength for plows of this size.

Truck hydraulic system plow raise and lower section shall be modified. Section shall be configured to provide the following functions:

Change section 3s in the base valve to the following description:

Section 3.1.	Plow Lift	30 GPM	4W/4P A-port LS relief set @ 1000 PSI, B-port LS relief set @ 1250 PSI w/ 4th position float.

1. Plow reverse circuit does not require a cushion valve as this comes with the plow.
2. The four plow hydraulic couplers shall be mounted behind the hitch plate, 2 on each side on top of the truck frame facing outward and slightly back so water will not sit in them. A simple 2-hole plate shall be welded to each side of the truck frame with bulkhead fitting installed through it. On the inside of the frame the hose shall attach, on the outside.

3. Parker SM-500 series couplers shall be installed as follows:
   Left frame rail from front: Plow Down - female Parker SM-501-8FP
   Plow Up - male Parker SM-502-8FP
   Right frame rail from front: Plow Right - female Parker SM-501-8FP
   Plow Left - male Parker SM-502-8FP
   Top of frame rail shall be marked beside each coupler as to it's function - L, R & UP, DN.
4. Hitch assembly shall be powder coated black.

OPTION NO. 24: AUTOMATIC TIRE CHAINS (TC)

Vendors are asked to bid the complete cost for providing and installing a set of Insta-Chain 12-strand automatic tire chains. Kit shall be the manufacturers model recommended for the chassis rear suspension. Kit shall be installed according to manufacturers instructions. Insta-Chain: 801-489-9000.

OPTION NO. 25: AUTOMATIC TARP (AT)

Vendors are asked to bid the complete cost for providing and installing an automatic electric tarp system on the dump body. Tarp system shall be a front-to-back style with folding side flaps sized to correctly fit the body length, width, and side height. Side flaps shall completely cover and protect salt load in body. Tarp material shall be waterproof and able to stand use with hot asphalt (400-500 degrees) in summer use. Side flap tie down brackets and straps shall be provided and correctly installed on the dump body sides. System shall include bolt on external body side mount springs, galvanized steel arms, offset elbows and tension bow, tarp spool with wind deflector shield, mounted on the dump body cab protector. Electric motor shall be manufacturer's best heavy duty weather sealed design. Switch to be installed in truck cab, circuit properly overload protected. Approved equal is a U.S. Tarp 11526.

OPTION NO. 26: CASTING HYDRAULIC CIRCUITS (CH)

Vendors shall bid the complete cost of providing two additional hydraulic sections suitable for operating the 'casting' feature of a Wausau Everest RAC-11 (i.e.: Frink Reverse-A-Cast) front snowplow. Because the flow requirement is small an electric circuit divider device can be employed. Electric DPDT, 3 position, ON/OFF/ON switch shall allow selection of 'Cast Right' and 'Cast Left' using the same front plow stick function as would normally be 'plow left' and 'plow right'. Switch conveniently mounted near the front plow control lever. Required additional hydraulic lines shall be ran to the front and terminate in the same area as the standard plow reverse couplers, with 3/8" coupler sets installed, left male/female and right female/male. Couplers shall be labeled.

(Vendor may copy as needed)

Due on or Before
5 Business days
before letting date

If Required
Mail At Once

Letting Date: December 1, 2010

If Required
Mail At Once

Iowa Department of Transportation
Bidders Request for Exceptions or Equal
Proposal No.: 4618

Item: 11A07: Single Axle Snow Removal Trucks

Bid Proposal
Requests:_____

_____

_____

Bidder Proposes to furnish in lieu of above:_____

_____

_____

_____

Mail/Fax to:

Iowa Department of Transportation
Attention: Jerry Giebelstein
Office of Procurement and Distribution
800 Lincoln Way
Ames, Iowa 50010
Phone No. 515-239-1347
Fax No. 515-239-1538
jerry.giebelstein@dot.iowa.gov

By_____

Company_____

Address _____

_____
City State Zip Code

Phone No._____

Fax No. _____

==========

DOT USE ONLY

Approved_____ Disapproved_____

Reason_____

_____

Signature:_____ Date:_____